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THE COLOR COMPUTER MONTHLY MAGAZINE

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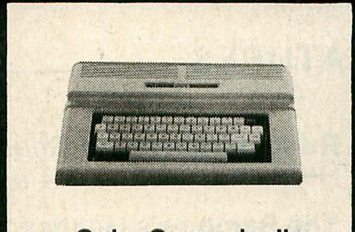
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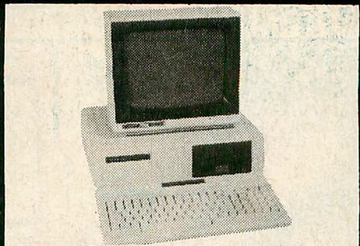
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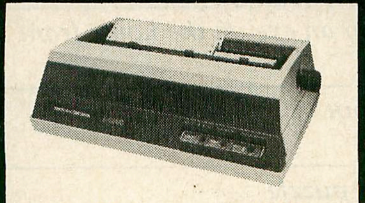
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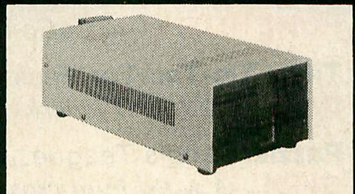
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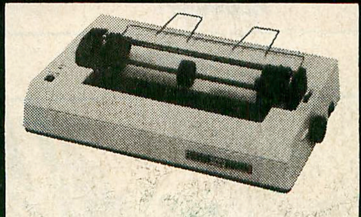
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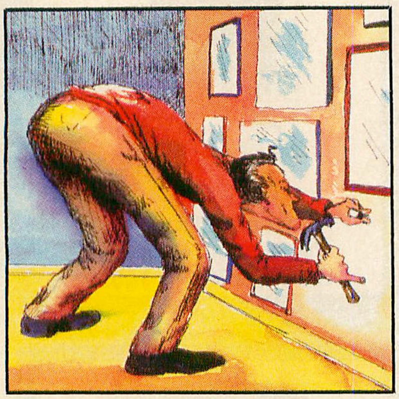

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NEXT MONTH: Since January marks new beginnings, our Beginners issue will have the premier of a new column on assembly language by Bill Barden. For our new CoCo owners, there'll be plenty of games, graphics and helpful programs to get you acquainted with your new friend. Whether you're an experimenting beginner or a veteran programmer, make a resolution to have THE RAINBOW on hand, and you'll start the new year right with the best, most comprehensive Color Computer magazine!

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LETTERS TO THE RAINBOW

Making A Good Thing Better

Editor:

If you haven't already reviewed *Telepatch*, please do so quickly. *Telewriter-64* is surely one of the most popular programs available for CoCo. However, Cognitec has left oversights and shortfalls unaddressed for some years now. I just purchased *Telepatch* from Spectrum Projects and found that it ties up all the loose ends.

Before I could afford a disk drive I used *Telewriter* to write a term paper — some 400 pages on cassettes! I purchased a disk drive and a *Telewriter* upgrade immediately. The results were dramatic. *Telepatch* is exactly the ticket for me — my disk purrs along at six ms access time, my printer at 9600 Baud, my keyboard is buffered (my typing speed is higher than *Telewriter* would otherwise permit). Further, much of my programming is done by using the ASCII filing system of *Telewriter*, and *Telepatch* greatly enhances *Telewriter's* abilities in that regard. The keyboard clicks if I would like, and the cursor fairly races around the screen now.

I am very pleased with *Telepatch*. Two suggestions to the authors of *Telepatch, Wiz* and *Telewriter*. First, publish a "deluxe version" soon. Second, get me *Telewriter* on OS-9 (then stand back!).

Michael L. Brant
Concord, CA

Editor's Note: *Telepatch* was reviewed in the October 1985 issue, Page 209.

Addressing the Problem

Editor:

May I submit a solution to a major problem? The problem: addressing an envelope. The CoCo word processor does a great job on the letters, but when it comes to the envelope it is a pain to remove the fan-fold paper and line up the envelope. My answer is an envelope with a window, like the envelopes *bills* come in each month.

The other half of the solution is to type, and save to disk or tape, a heading for your letters, along with a format line for your printer. Mark the spot with some X's where you want to type the addresses so, when folded, it ends up in the window. This is a great opportunity to display your artistic use of the printer's different fonts and graphics displays.

Thank you for bringing in Dennis Kitsz, I'm sure he will be an asset to RAINBOW.

Bill Frame
Niceville, FL

A Tool for any Trade

Editor:

This is in response to the letter from William Sill in the September 1985 issue [Page 8].

Mr. Sill states that when we have grown out of games, we will see that the CoCo will shine as an appliance. I play games on my CoCo, but I also use it for serious tasks. Why can't you see that a computer, any computer, can be used for serious things and for recreation. A computer is nothing more than a tool. A tool can be used for different things. You probably consider your car a tool. That car gets you to work. Yet that same car can take you on vacations. Computers are the same as cars. They can be used for many things.

David Moulton
Cody, WY

Hobby Link

Editor:

I recently discovered THE RAINBOW and it has renewed my enthusiasm in personal computers. It is the best magazine of its kind around and I find its approach very refreshing.

My interests lie mainly in interfacing, construction projects and applications programs. Having been a shortwave listener and Ham radio operator (K2AZ) for over 30 years, I found your recent *WEFAX* program [February 1985, Page 42] very interesting and would like to see similar articles that link my two hobbies. I receive Morse code, radioteletype (RITTY), *WEFAX* and other facsimile information regularly on a CoCo, Model 1 and IBM PC. I would like to exchange frequency lists with other readers. Write to me at 3 Sherman Avenue, 07950. Perhaps you could also occasionally print some station listings from readers similar to your BBS information.

John C. Maikisch
Morris Plains, NJ

COMMENTS

Editor:

I typed in the "Simple Text Processor" in the January 1985 issue [Page 103] of THE RAINBOW. I was wondering if there have been any improvements on it yet. If anybody has any, would you please write me at 6321 Bosker Lane, 48444.

I would also like to support Mr. Carroll. He mentioned [August 1985, Page 6] that he would like you to encourage your authors to write or modify their programs to work on tape-based systems. I think this is a good idea since many of us have only a tape-based system. It would be nice to have most if not all programs work with cassette-based systems.

While running the Text Processor on its printing subroutine my Radio Shack DMP-105 printer will lock up. I have to turn the printer offline and then back online before it will continue. When I use the greater than and less than signs to underline, the printer underlines but prints a [p] around the underlined area. Why do these things happen and how can I correct them?

John Gormley
Imlay City, MI

Editor's Note: Your problem is due to the fact that the program uses printer codes for a Brother Correctronic 50 typewriter and must be changed for use with your printer.

A Good Word for Mr. White

Editor:

I find Richard White's treatment of spreadsheets to be most informative, particularly with the comparisons of different sheets where he shows the strong and not so strong points of those that are the most popular. However, he did make a statement in the October 1985 issue of RAINBOW that *VIP Calc* will not take a leading space (Page 238, right column, Line 9). I find that *VIP Calc* will take a leading space if you first invoke the Label format using inverted commas (shift 2), which is the same command that *VisiCalc* uses for that purpose, then enter the space. The same command allows you to enter numbers as text.

The one thing I find most annoying with *VIP Calc* is when you make a new entry, or do a recalculation, the whole screen goes blank and then the sheet unfolds down the screen again. (Is that what is called "screen refresh"?) Does this happen with *DynaCalc*?

Why not have a similar column (columns) that gives the same treatment to word processors, database managers, accounting packages, etc., and even hardware, where appropriate.

A working comparison with an experienced user can be of infinitely more value to a prospective user than a short review, no matter how harsh, or generous, the review may be. This may lead to software producers attempting to incorporate more features than is now the case, because of what the individual packages are demonstrated to be capable of and, even if this is not the case, a user can choose the package that fulfills their purpose.

RAINBOW magazine is really the proverbial "pot of gold" — the only difference being that the treasure is found at the beginning as well as the end of THE RAINBOW.

Ray S. Preston
Rarotonga, Cook Islands

SPECIFIC PROGRAM SEARCH

Editor:

I would like to know if anyone has come up with a good program that works with Radio Shack X-pad. I would appreciate it if anyone would send me what information you have. My address is 6681 Marsh Road, 48039.

I would also like to hook up my CoCo to a Lionel train and would like to know if anyone has any information on this. If you do, please send me any information you have.

Brian Van Peteghem
Marine City, MI

Dr. CoCo

Editor:

Hopefully you can help me with two problems I am having. I own two TRS-80s, with Extended Color BASIC, dual disk drive, Tandy DWP-220 and DMP-110 printers. I am looking for a business-oriented package for a medical office, for patient records, accounts receivable and payable, spreadsheet capability, invoice generating, inventory control, etc. Does such a program exist for the CoCo? I have *Desktop, Scripsit on Disk, Small Business Accounting* by Colorsoft, and their *Accounts Receivable* program, but they do not seem to fit my application. Please, if you or any of your readers know of such software, contact me at 3340 Tully Road, Suite C-1, 95350, or phone (209) 571-3453.

Also, is there a full-size screen dump program for the DMP-110? If your readers can help me out, it would be greatly appreciated. I have owned my CoCos for less than one year and have graduated from games and Adventures to using it in my business for letter writing and other report writing, but would like to fully utilize the power of CoCo. Thanks for the help. RAINBOW has been a great help in learning how to use both my new toys.

Jack R. Morris, D.C.
Modesto, CA

Editor's Note: Please read the following letter from Chuck Hawley.

Editor:

From month to month, as I thumb through THE RAINBOW's "Letters to the Editor" and "Downloads" columns, I notice many people looking for graphics screen dumps. Also, many of the screen dumps I have seen have been for the Line Printer VII or similar. None for the Radio Shack DMPs.

So, after a few tries I came up with *FastDump*, which I use with my DMP-120. It's a rather short program so it could be used as a subroutine in a graphics program. The only drawbacks are that it takes about 10 to 15 minutes to print up a graphics screen, and the printout is a rather small version of the screen. But you can't expect a miracle in 15 lines!

```
1999 REM WORKS IN PMODES 0, 2, AND 4
2000 PRINT#-2,CHR$(18)
2010 CH=0
2020 FOR R=0 TO 191 STEP 7
2030 COL=0
2040 IF  PPOINT(COL,R)<>0  THEN
     CH=CH+1
2050 IF PPOINT(COL,R+1)<>0 THEN
     CH=CH+2
2060 IF PPOINT(COL,R+2)<>0 THEN
     CH=CH+4
2070 IF PPOINT(COL,R+3)<>0 THEN
     CH=CH+8
2080 IF PPOINT(COL,R+4)<>0 THEN
     CH=CH+16
2090 IF PPOINT(COL,R+5)<>0 THEN
     CH=CH+32
2100 IF PPOINT(COL,R+6)<>0 THEN
     CH=CH+64
2110 PRINT#-2,CHR$(128+CH);
2120 COL=COL+1:CH=0:F COL<255 THEN
     2040
2130 PRINT#-2,CHR$(128)
2140 NEXT R
```

Chuck Hawley
Parma Heights, OH

Martial Bliss

Editor:

I would like to tell you that I enjoy receiving each issue of THE RAINBOW; I read them from cover to cover. I would also like to tell you how much I enjoy RAINBOW ON TAPE.

I wondered if any company has ever made a martial arts program for the CoCo. I have searched through your magazines and haven't seen one yet. Is there anyone out there who has made a martial arts program and would like to sell it to me? If so, please contact me at 7489 Kellogg Road, 44077.

Kevin Nasky
Painseville, OH

HINTS AND TIPS

Editor:

I ordered a 64K conversion for my 16K CoCo from Skyline Marketing in Chicago. It arrived, I installed it and it worked. They also included a "pager program." With this combination, I have two banks of 22,823 bytes of memory.

By combining my business programs and a menu, I use 20,649 bytes on Page 1. This leaves Page 2 open with 22,823 bytes for personal programs; I have managed to merge programs and add a menu using only 14,766 bytes.

Each of the two programs contains an "escape" line to "exec" the alternate page of programs. Just how many of your readers keep 35,415 bytes ready and on-call at all times?

L. Jackson
Forest Park, OH

'Relatively' Helpful

Editor:

Here is a little program I concocted after hearing from a former classmate that he was very busy during his retirement with tracing his ancestry. He has found 6,000 so far, not all of them completely documented, I assume. In any event, running the program should prove interesting to some of your readers.

```
1 REM:ANCESTRY
2 REM:KONRAD H. KOSSMANN
3 REM:ENTIRE WORLD POPULATION
  AT BEGINNING OF CHRISTIAN
  ERA ESTIMATED AT 250 TO 350 MILLION
4 X=2:W=1880:PRINTX,W
5 Y=2*X:W=W-30:PRINTY,W
6 W=W-30:Z=2*Y:PRINTZ,W
7 X=Z
8 GOTO 5
9 REM:CONCLUSION A: INCEST MUST HAVE
  BEEN QUITE COMMON CONCLUSION B:
  WE ARE ALL RELATED
10 REM:W=YEAR,30=ONE GENERA
  TION
```

Konrad H. Kossmann
Columbus, OH

RAINBOW Superlatives

Editor:

As much as I appreciate your magazine it is unfortunate (for me) that I discovered THE RAINBOW just within the past year. I say unfortunate because I know I've missed many good programs and/or tips and advice on using the CoCo. Therefore, I would like to suggest to you to put together a "best of" issue or series. I hope you will seriously consider the concept.

The following one-line program will center any title or heading on an 80-column printer.

```
1 CLS:INPUT"TITLE";T$:L=INT(80-
LEN(T$))/2:PRINT#-2,TAB(L);T$:RUN
```

I hope this one-liner will be helpful to your readers. Thank you for a great magazine and keep up the excellent work.

P. Giordano
Quebec, Canada

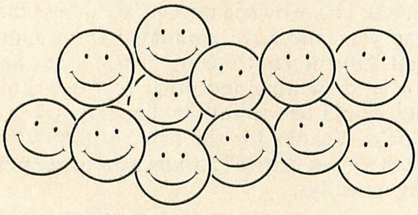
The Gang's All Here!

Editor:

Congratulations on adding Dennis Kitsz to your staff. You picked up a valuable asset. We already know what he looks like from his ads, and we've all seen pictures of Mr. Falk. As for the rest of the staff, I only have a mental picture of what they might look like. Personally, I'd like a chance to match up the voices and/or bylines with the faces. Do you think you could print pictures of: Jim Reed, Jutta Kapfhammer, Dan Downard, R. Bartly Betts, Steve Blyn, Frank Hogg, Joseph Kolar, Michael Plog, Dale Puckett, Fred Scerbo, Richard White and Richard Ramella.

I realize this doesn't cover everybody, but they're the names I most often see and wonder about.

Bill Bernico
Sheybogan, WI



Recent staff portrait

Prolific Pokes

Editor:

I have wanted, for some time, a list of CoCo POKEs and their functions. Every month there is someone who has found a new POKE to use with a computer game or in programming. If anyone who knows of any POKEs would send them to me, I'd be more than happy to return a list of all the POKEs I receive. Be sure to include the name of the program and company if the POKE helps you in a program (e.g., additional turns). My address is R.D. #2, Box 751, 13167.

Because of the cost, I can only give lists to the original contributors. Include as many as possible to be sure a new one is there.

Dave Mount
West Monroe, NY

INFORMATION PLEASE

Editor:

I have a DWP-210 printer and love it. It's a bit slow, but the printout is beautiful. My problem is the only print wheels available through Radio Shack are basic "typewriter" faces. What I need is something to use as italics. For two years, I've been trying to find out who made the DWP-210 for Radio Shack and/or who makes compatible daisy wheels, but to no avail; now my problem is even greater, since the DWP-210 printer is an orphan because it has been replaced by the DWP-220. If anyone can tell me where I can get other print wheels, I'd be greatly appreciative. Please write to me at 7410 NW 11 Court, 33313.

A second question is whether there is a program that will support right-hand justification of proportional spacing for the DWP-210. I use *VIP Writer* for word processing (work letters, law school papers and general correspondence), and have managed to make it do just about whatever I want. It would be perfect if I could use propor-

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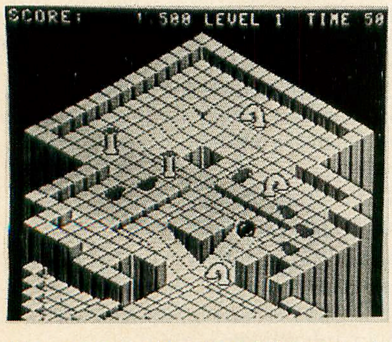
MARBLE MAZE



Move your marble around the mazes in your search for the finish line! Avoid the marble eaters, acid puddles and other creatures that inhabit the mazes. Avoid falling into holes or off the edges of the maze. Enter the **MARBLE MAZE contest:** the first five people to solve all the levels and identify the message and number win a free game from DIECOM PRODUCTS!

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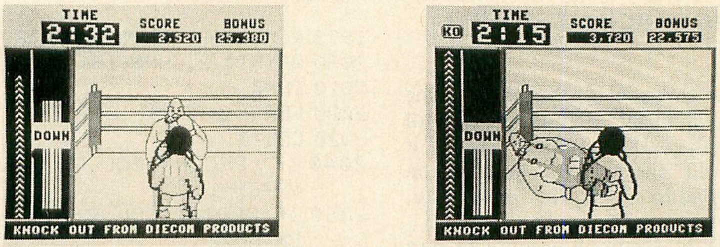

Fight against five different boxers in this great boxing game! At first the boxers are easy to knock out, but beware, it gets harder as you move on. The boxers are out to stop you in your quest to become champion of the world. But once you become champion your task is not over. You will then have to defend your title against those trying to regain the championship from you. Outstanding graphics make this a must for your collection!

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tional spacing, because it would almost look typeset. Such a program would not need all of the features of a word processing program — you could do the basic work with *VIP* or something else — just make it print out "pretty."

Phillip H. Snaith
Plantation, FL

Editor:

I really enjoy reading RAINBOW. I especially liked *Rockfest II*, which was featured in "Wishing Well" (July 1985, Page 162). Could you please tell me the issue in which you featured *Rockfest I*?

Chris Leazer
Mooresville, NC

Editor's Note: *Rockfest I* can be found in the May 1984 issue, Page 89.

Assembly Acclimation

Editor:

I would like to know how to do the equivalent of `PMODE4,1:SCREEN1,1` in pure assembly language. Send correspondence to 21 Prospect Avenue, 01940. Thank you.

Jon Fabris
Lynnfield, MA

What Next?

Editor:

I am writing a program that uses the disk drive but I can't figure it out. I am making it say "Hello, I'm your Color Computer," then "What is your name?" Then it says "Hi, Greg." Next, I have it ask "Would you like to play a game?" You type "yes" or "no." Then it says "What game would you like to play — drawing/zodiac/pop/bigfoot?" I can't figure out when you type in what game you would like to play and how to load it from the disk drive.

Here is a listing of my program.

```
 10 PRINT"Hi, I'M YOUR COLOR
    COMPUTER"
 20 PRINT"WHAT IS YOUR NAME?"
 30 INPUT A$
 40 PRINT"HI,"A$
 50 PRINT"WOULD YOU LIKE TO PLAY A
    GAME?"
 60 INPUT B$
 65 IF B$="YES" THEN 70
 70 PRINT"WHAT GAME WOULD YOU LIKE
    TO PLAY, MUSIC/DRAWING/
    ZODIAC/POP/ OR BIGFOOT?"
 80 INPUT C$
 90 C$="?"
100 LOAD " "
```

Greg Garnett
Florence, KY

Editor's Note: Try changing lines 90 and 100 to:

```
90 C$=C$+".BAS"
100 RUN C$
```

KUDOS

Editor:

I could not resist this opportunity to tell you how much your magazine has meant to me and increased my knowledge and interest in my CoCo. Until I discovered THE RAINBOW, other magazines did not inspire or assist me nearly as much as yours has. I have also trusted your judgments and used your advertisers almost exclusively when ordering software and hardware. Thanks millions.

I would also like to commend and recommend two of your advertisers: Software Plus in Citrus Heights, Calif., and Reitz Electronics in Toledo. Both have rendered excellent service and satisfaction thus far.

Stan Weaver
Toledo, OH

Making Sparks

Editor:

I believe in giving credit when and where it's due. But first, let me explain. I have been a CoCo owner for a little over a year and enjoy every opportunity I have to use it. However, I have tried everything to spark an interest in computers among my wife and three daughters.

Then came THE RAINBOW. I think it's great. Now my wife occasionally helps me type in a program and the girls will come in and watch the results, but nothing further.

I liked Dave Koscinski's "One-Liner" [February 1985, Page 233] so much that I saved it and showed it to the family. My wife and oldest daughter have not left my CoCo alone since. RAINBOW, you're doing a great job and a special thanks to Dave Koscinski.

Jim DeCarlo
Wilmington, DE

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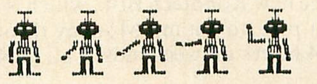

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READ THE REVIEW IN JANUARY'S RAINBOW
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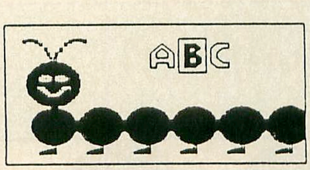

REVIEWED IN THE JUNE '85 ISSUE OF THE RAINBOW

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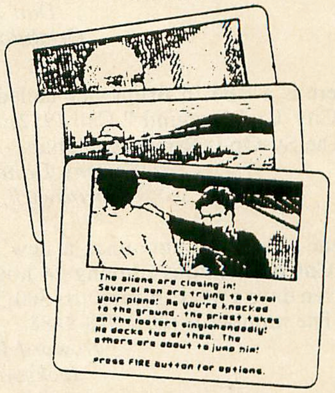

The aliens are closing in! Several men are trying to steal your plane! As you're knocked to the ground, the priest takes on the looters singlehandedly! He decks two of them. The others are about to jump him!

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Editor:

I am writing to congratulate you on your excellent magazine. I have seen two other magazines just for the CoCo. I thought they were good magazines, but when compared to THE RAINBOW, well, let me say I haven't bought any other CoCo magazines since I got my first RAINBOW. It is everything I wanted: a computer catalog, a list of reviews, an informative book and all the great programs. It really is a "pot of gold."

David Harris
Idaho Falls, ID

BULLETIN BOARD SYSTEMS

Editor:

We have a BBS that is maintained by Valley Micro Systems. This BBS supports down-/uploads as well as a message base. Call (209) 526-2030 9 a.m. to 9 p.m. PST. My phone is (209) 523-5176 anytime after 9 a.m. PST. For more information write to 801 W. Roseburg Avenue, Suite 200, 95350.

Ken Denny
Modesto, CA

- Custom Key Computer Services supports a BBS at (305) 281-0082 as long as Color Computer people desire to use it.

Dan Mills
Orlando, FL

- There is a BBS in Brunswick called the "Port City Underground." Call (912) 265-5045. The SysOp is Robert Callahan.

Tommy Donovan
Brunswick, GA

- I am pleased to announce a new BBS called CoCo Creations running 24 hours a day, seven days a week. It supports 300/1200 Baud. The number is (201) 928-9488.

Howard Wolk
Jackson, NJ

- This is to inform all CoCo users of the Fido BBS of Ann Arbor. It runs on an IBM PC, supports 300/1200 pbs. We have a large library of CoCo programs. Call (313) 662-2184.

Jason Johnson
Milan, MI

- Call the Kings Byte Computer Club, Inc. BBS at (718) 837-2881, 24 hours a day.

Morty Libowitz
Brooklyn, NY

- The Rainbord BBS is online 24 hours a day, seven days a week. The system supports up- and downloading and many more features. Call (513) 236-8307.

David D. Phillips
Dayton, OH

- The new number for the BBS in Morristown is (615) 581-9752 and voice calls will be taken on (615) 581-2904.

Marty Cline
Morristown, TN

- I would like to inform your readers of a new BBS. "Chroma-com 80" is online 24 hours a day, seven days a week. The number is (804) 853-2080.

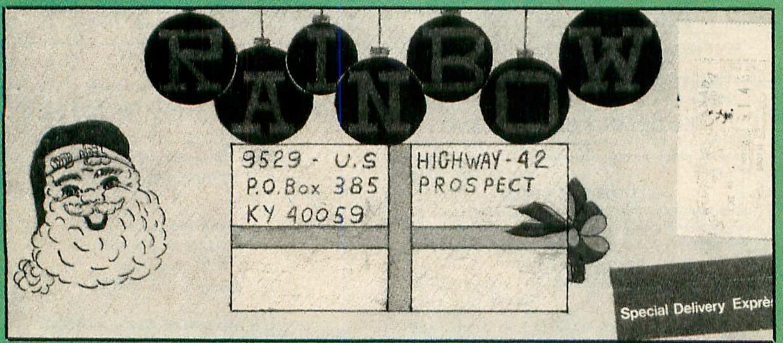
Harry Lee Perkins, III
Norfolk, VA

- I would like to inform your readers of the new Robotech BBS, which is online from 11 p.m. to 4 p.m., Monday through Friday, 24 hours on weekends. Call (304) 287-2341.

Jeff Frost
Carlonia, WV

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

ARTS AND LETTERS



Envelope Of The Month

P. Langlois
Montreal, Canada

These Introductory Level stories are now available for TRS-80 Color Computers.

If you have a TRS-80 Color Computer with disk drive, the stories below offer the perfect introduction to the addictive pleasures of Infocom™ interactive fiction.

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Call 1-800-262-6868 to order.
The TRS-80 Color Computer versions of these stories and the ones shown on the opposite page are not available in any store. Call toll-free to order yours now.

INFOCOM™

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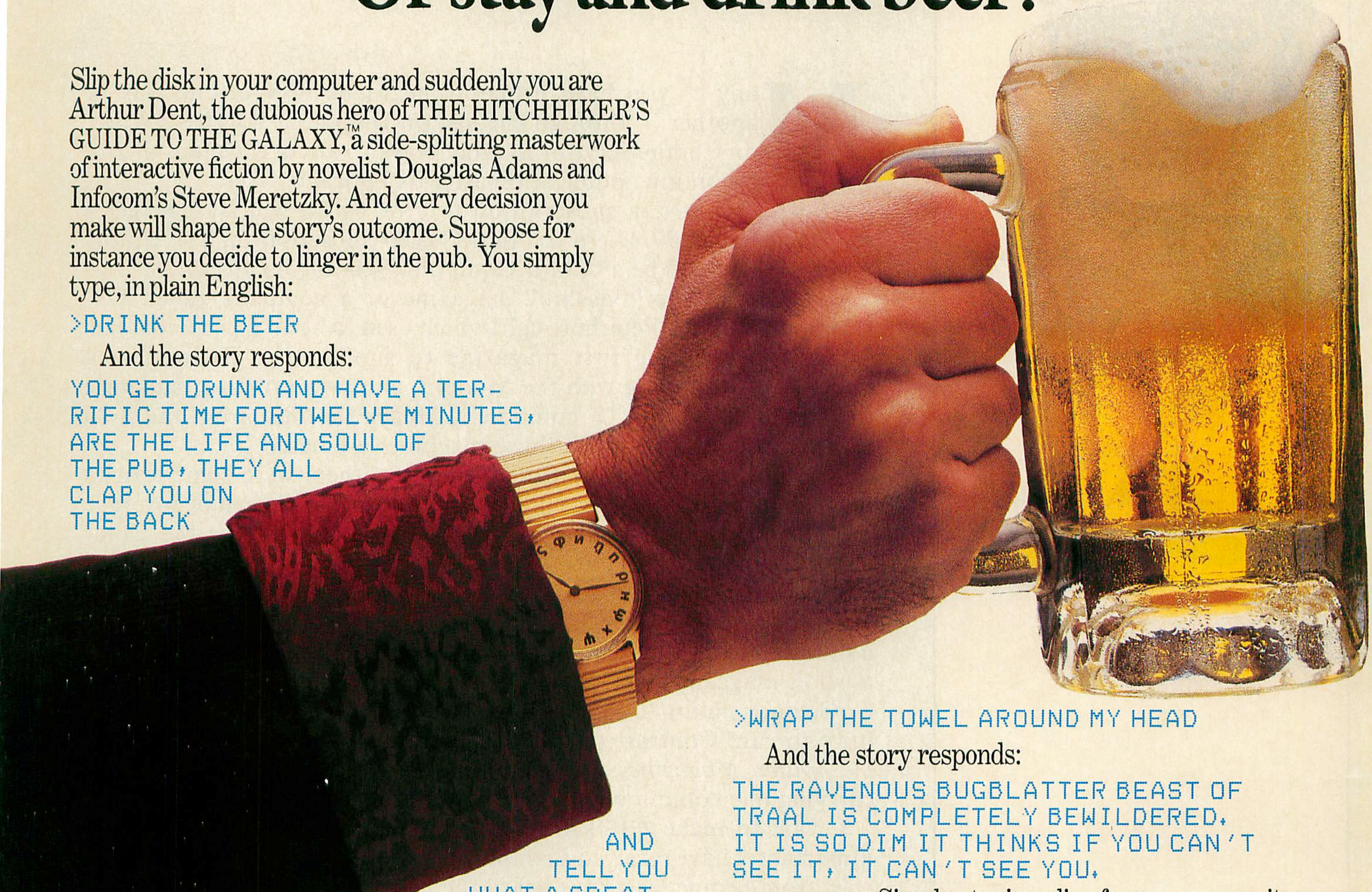
Earth will be destroyed in 12 minutes to make way for a hyperspace bypass.

Should you hitchhike into the next galaxy? Or stay and drink beer?



Slip the disk in your computer and suddenly you are Arthur Dent, the dubious hero of THE HITCHHIKER'S GUIDE TO THE GALAXY,™ a side-splitting masterwork of interactive fiction by novelist Douglas Adams and Infocom's Steve Meretzky. And every decision you make will shape the story's outcome. Suppose for instance you decide to linger in the pub. You simply type, in plain English:

```
>DRINK THE BEER
```

And the story responds:

```
YOU GET DRUNK AND HAVE A TERRIFIC TIME FOR TWELVE MINUTES, ARE THE LIFE AND SOUL OF THE PUB, THEY ALL CLAP YOU ON THE BACK AND TELL YOU WHAT A GREAT CHAP YOU ARE AND THEN THE EARTH GETS UNEXPECTEDLY DEMOLISHED. YOU WAKE UP WITH A HANGOVER WHICH LASTS FOR ALL ETERNITY. YOU HAVE DIED.
```

Suppose, on the other hand, you decide to:

```
>EXIT THE VILLAGE PUB THEN GO NORTH
```

In that case you'll be off on the most mind-bogglingly hilarious adventure any earthling ever had.

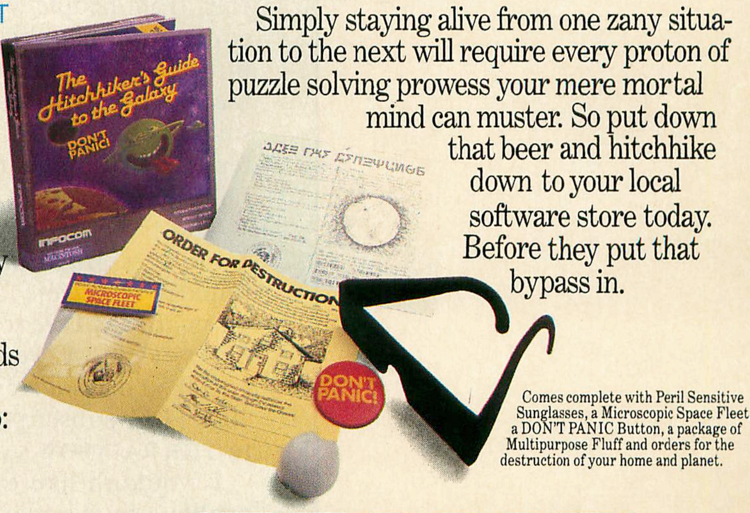
You communicate – and the story responds – in full sentences. So at every turn, you have literally thousands of alternatives. If you decide it might be wise, for instance, to wrap a towel around your head, just say so:

```
>WRAP THE TOWEL AROUND MY HEAD
```

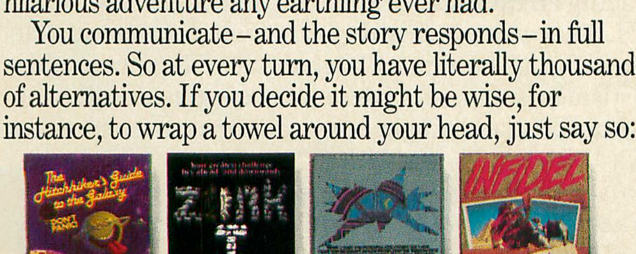
And the story responds:

```
THE RAVENOUS BUGBLATTER BEAST OF TRAAL IS COMPLETELY BEWILDERED. IT IS SO DIM IT THINKS IF YOU CAN'T SEE IT, IT CAN'T SEE YOU.
```

Simply staying alive from one zany situation to the next will require every proton of puzzle solving prowess your mere mortal mind can muster. So put down that beer and hitchhike down to your local software store today. Before they put that bypass in.



Comes complete with Peril Sensitive Sunglasses, a Microscopic Space Fleet, a DON'T PANIC Button, a package of Multipurpose Fluff and orders for the destruction of your home and planet.



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Many of you have probably heard by now in one way or another — through friends, on Delphi, at RAINBOWfest, on CompuServe or in other ways — about the plans of *Hot CoCo* to discontinue publication after its February issue.

Those who have a subscription to *Hot CoCo* will start to get a magazine called *80 Micro* to "fulfill" their subscription. The editors promise there will be a "Color Computer Section" in *80 Micro*.

80 Micro is the "flagship" magazine of a company called CW Communications/Peterborough, which used to be Wayne Green, Inc. In fact, *80* was the first magazine to support the Radio Shack computers, beginning with the Model I, and now primarily supports the Model I, III and IV computers. Hence the "80" from the Z-80 central processor on which those machines are based.

A long time ago, in the CoCo's infancy, there were some articles in *80* about the Color Computer. It was *80 Micro*'s dearth of coverage of the CoCo that inspired me to start a newsletter for the Color Computer. That newsletter, of course, grew into THE RAINBOW.

Knowing the people at CW Communications pretty well, I would suspect those who have subscribed to *Hot CoCo* will get more than a smattering of Color Computer news. It certainly won't be like having a whole magazine, but I believe there will be a genuine effort to bring CoCo information to *80 Micro*, at least for as long as the subscriptions have to run. Contrast this, if you will, to the demise of *The Color Computer Magazine*, which "fulfilled" with Creative Computing, carrying one column on all Tandy products.

I want to make THE RAINBOW's position clear. And I think it is important. I have received a couple of letters and quite a few telephone calls from people who have heard the news about *Hot CoCo* and are concerned that this constitutes an erosion of support/popularity/utility for the Color Computer. I happen to not think so. I want to make it clear that no one at CW Communications/Peterborough has said this as of this writing, but there has — in the past — been a tendency to blame the market, not the products themselves, for the failure of a product.

The truth of the matter is that both *Hot CoCo* and *The Color Computer Magazine* came into the market too late to have a great impact. They were facing an established product, THE RAINBOW, with an established record. They were publishing magazines of around 100 pages while we were running between 250 and 300. They were able to sell 50 or so advertisments an issue, while we were able to sell over 100. Their subscription rolls, and single-copy sales, never came close to THE RAINBOW's.

I wouldn't like to see anyone equate the end of *Hot CoCo* to a problem in the market. The end of *Hot CoCo* merely means that a product has failed. There are many other products for the Color

Telewriter-64™

the Color Computer Word Processor

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Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

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> — The RAINBOW, Jan. 1982

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RAINBOW
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SEAL

Computer — and for every other computer — that have failed as well.

Here at THE RAINBOW we see the CoCo future as bright. Tandy has announced new, lower, Christmas prices for the CoCo, we foresee a new Color Computer sometime next year, and our own business remains healthy. I expect the Color Computer — and THE RAINBOW — to be here for a long time to come.

The other reaction we have been hearing to the *Hot CoCo* announcement is that some members of the CoCo Community are concerned that we are now the only Color Computer magazine available.

As a message on CompuServe noted the other day: "What will Lonnie do now that he has a monopoly?" While I hardly see that we have a "monopoly," I think it might be interesting to you to know some of the things we are, indeed, going to do.

> ***"I believe that holding the line on all our prices expresses much more than mere words our confidence in the CoCo and the CoCo Community."***

For the first time since we have been in business, we do not plan to increase subscription prices at the end of the year. Based on our business and budget projections, and assuming they are right, we plan to keep subscription prices the same throughout 1986. The same goes for single-copy prices. And, as an aside, we will not be increasing our advertising rates, either.

I believe that holding the line on all our prices expresses much more than mere words our confidence in the CoCo and the CoCo Community. We have always been devoted to the betterment of the CoCo Community and I see this plan — despite some rising costs here — as a good one for all of us.

In the past, when we did increase prices at the end of the year, we offered everyone an opportunity to renew their subscription to THE RAINBOW at the old subscription rate so long as they did so by the end of the year. Since we won't increase prices this time around, we have another deal that I hope will be just as attractive.

If you renew your subscription before December 31, 1985, at the present rate ($31 in the United States, U.S. $38 in Canada, U.S. $68 other foreign surface mail or U.S. $103 other foreign air mail) you can order a set of RAINBOW Binders for $11 instead of $13.50 (plus $2.50 shipping and handling via UPS or $4.50 shipping and handling foreign and to a post office box). That's a savings of over 18 percent and it will not only ensure you of another year of THE RAINBOW, but also give you a set of two attractive binders in which to store them. THE RAINBOW is so big it takes two binders to store a year's worth.

There are two rules to this offer: First, you have to have both your subscription renewal and binder order in by December 31, 1985 (that means postmarked by that date), and second, you must order *both* at the same time.

We won't repeat this price on the binders. We've found that many members of the CoCo Community wait until the end of the year to renew to take as much advantage of our "old rate" subscription offer as possible. Since there will not be a "new rate" for subscriptions this time, we thought the binders and subscriptions would make a nice package for you.

In fact, it may be a perfect holiday gift, too. And if it is a gift, we'll even send a gift certificate!

Which brings me to wish you and yours a most happy, healthy and prosperous holiday season and New Year from me, personally, and all of us at THE RAINBOW.

At this time of the year, I think we all seem to be closer to one another. And I have always had this special feeling for all of the CoCo Community, too. After all, despite the fact that we are scattered all across the world, that we come from many backgrounds and that we have a wide variety of interests, we all "belong" — and I think that is important.

Happy holidays to everyone!

— Lonnie Falk

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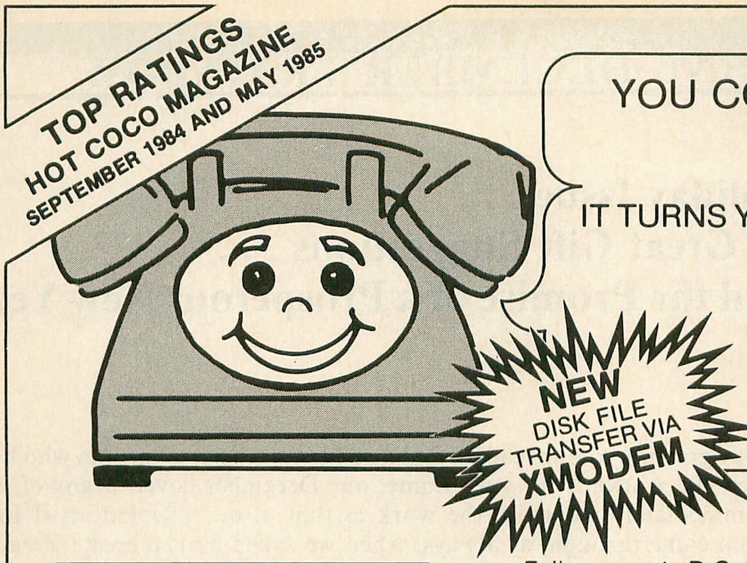

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BUILDING DECEMBER'S RAINBOW

Our Holiday Issue . . . With Great Gift Suggestions . . . And the Promise of a Prosperous New Year

A holiday greeting to our readers and a salute to the postal people who help deliver THE RAINBOW to your home: our December cover. Many of you will immediately recognize the work as that of our talented artist **Fred Crawford**, who came through, as always, when we asked him to create a warm, friendly painting to serve as a greeting card from all of us to all of you, wishing you the very best for the holiday season and the coming new year!

Yes, this is our Holiday issue. And, though there's a jack-o'-lantern lit up tonight in my office window at this mid-October writing, there's been a Santa's workshop atmosphere about THE RAINBOW editorial offices as we've scurried about to pull this month's package together.

Chanukah lights, holiday music and graphics, an *Alpine Slopes* game, assorted Christmas pageantry and a salute to the most famous reindeer of all are part of our stocking stuffer issue. As with holiday shopping, it was hectic, but fun. We turned the entire place (especially my office) upside down to do **Lonnie Falk's** last minute idea — our "Rainbow Holiday Shopping Guide" — but that just added to the festivity!

Some of our staff members were hastily drafted to serve as models in our holiday shopping layout, providing a partial answer to one of this month's "Letters to Rainbow" asking what we look like. Let me introduce three of those who help build THE RAINBOW each month (see Page 25). That's designer **Tracey Jones** smiling at us with the EARSphone on. Designer (and camera ham) **Kevin Quiggins** holds a JDOS drive, while editorial assistant **Angela Kapfhammer** (Jutta's sister) appears to be wrapping a gift in her living room; actually, she's in Bond Pharmacy next door, just out of reach of row upon row of drugstore items. Oh yes, the hands belong to advertising representative **Kim Vincent**. We hope the gift suggestions help you pick the right thing for the CoCo lover in your life.

Along with our holiday theme we have some hard-hitters in our editorial mix: **Richard Duncan** continues with his *CoBBS* program development; veteran contributor **Dennis Weide** begins developing a CoCo burglar alarm; and, the newly-elected president of the national OS-9 Users Group, **Brian Lantz**, joins our "RainbowTech" staff. How's that for rounding out the year with a bang!

The new year has its own special beginnings for THE RAINBOW, too. We're pleased to announce that **William Barden, Jr.**, author of some 30 computer books, is adding new distinction to our eminent corps of contributing editors. No wonder we're in a mood for revelry around here.

Lastly, a gift idea of my own. I recently received a review copy of the revised and updated edition of **Alfred Glossbrenner's** excellent work, *The Complete Handbook of Personal Computer Communications*. I sincerely believe it lives up to its billing that it covers "Everything you need to go online with the world." At 552 pages, it's more than 200 pages longer than the original 200,000-copy bestseller, and I commend it to your attention. It is so filled with useful tips and solid information that our reviews editor, **Monica Dorth**, can't pry it out of my hands: hence, this mini-review. It is just what I needed to go online in RAINBOW's new Color Computer group on Delphi. Which brings me to my holiday invitation: Check our ad in this issue about free membership and free time on Delphi for RAINBOW subscribers, both old and new. We're bringing the CoCo Community closer together — and want you to join us!

— Jim Reed

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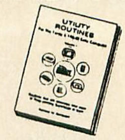

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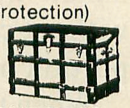

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RUDOLPH

The Red-Nosed Reindeer

A tribute to "the most famous reindeer of all"

By Ellen and George Aftamonow

Christmas is a joyous, festive time of year, and a good time to sit back and let the CoCo display its colorful capabilities. In the tradition of the season, this feature uses "Rudolph the Red-Nosed Reindeer" as the background for a story-telling graphics and music program. Your computer's screen will present a series of graphics illustrations, which match the song's lyrics, while playing the famous holiday tune. *Rudolph the Red-Nosed Reindeer* takes advantage of the `POKE 178` command, which allows a brilliantly colored screen that otherwise would not be possible.

While written on a 64K ECB computer, *Rudolph* should work on any ECB with 16K or greater. There is a speed-up `POKE` in Line 750. If your computer cannot handle the `POKE 65495,0` command, it may be deleted without causing any appreciable effect on the animation portion of the program.

When the program first starts, you will see a large dot on your screen. This dot should be red. If not, press Reset and `RUN` until you get a red dot, or instead you'll have "Rudolph the Blue-Nosed Reindeer." □

(The Aftamonows are a husband and wife team of self-taught programmers who live in Milford, Conn. Ellen holds a degree in math and concentrates on the inner makeup of the program, while George comes up with the ideas and designs the graphics. Their combined efforts have resulted in the publication of several of their programs in computer magazines.)

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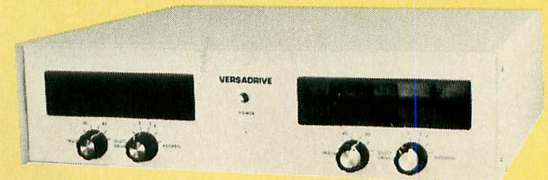

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J&M:	JFD-CP Disk Cont w/JDOS	$139.00	CC802-AA:	$594.00*
J&M:	JFD-CO CO Disk Cont. w/JDOS	$ 99.00		

*Price Includes:
Cable to Controller • Large Dual Drive Cabinet
Four Surge Protected Switch Controlled Outlets • Complete Instructions

INCREASE YOUR DATA STORAGE

Store over four times the data of a Standard Radio Shack® FD-501 disk drive with each Versadrive disk drive. Versadrive's quality features include a transformer power supply, gold connectors, surge protected duplex outlets that allow all your peripherals to be powered on and off with the Versadrive power switch, and a heavy guage versatile all-metal cabinet with high spec components to provide trouble free operation.

The Model CC801 (single disk drive) can load and format disks with either 35 or 40 tracks, and copy your 35 or 40 track disks to 80 track, saving valuable disk space.

Versadrive requires a controller and is compatible with the standard Radio Shack® and J&M disk controllers. We highly recommend the J&M controller. Our experience has shown their gold contacts to be a real plus for reliability. You may order J&M controllers from us at a discount.

If you have a Radio Shack® disk drive or drives, they may be used with Versadrive by ordering our A or AA models. All models are shipped with complete instructions and necessary cables.

Protect *your CPU*, printer and other devices by using Versadrive's surge *protected* outlets and also enjoy the convenience of turning all your peripheral devices on and off with one switch. A quick glance at Versadrive LED shows you the power status of all devices using Versadrive's outlets.

Versadrive will run on TRS 80, Models III & 4 as drives III and 4 in 40 track mode.

Performance Specifications	**40 Track** Mode	**80 Track** Mode
Capacity (in bytes) Unformatted		
Per Disk	500,000	1,000,000
Per Surface	250,000	500,000
Per Track	6,250	6,250
Access Time		
Track to Track	6 msec	3 msec
Average	93 msec	94 msec
Settling Time	15 msec	15 msec

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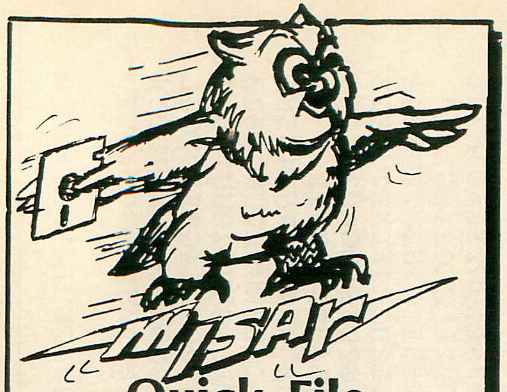
90	43
220	236
330	12
410	36
520	143
670	67
END	57

The listing: RUDOLPH

```
1 'GEORGE & ELLEN AFTAMONOW
2 '46 HOWE ST.
3 'MILFORD, CT 06460
10 DIMS(1),R(100)
20 P1$="~~T3O3~~L8GAL4GEO4CO3AL2.GL8
GAGAL4GO4CO3L1B":P2$="L8O3FGL4FD
BAL2.GL8GAGAL4GAL1E":P3$="O3L8EF
L4EDBAL2.GL8GAGAL4GO4DL1C":P4$="
O2L4AAO3CO2AGEL2GL4FAGFL1E":P5$=
"O2L4DEGABBL2BO3L4CCO2BAGL8FL2D"
30 R1$="R9U2E3U2 R4ENR4BL6NFLH2L
D2G2DG5 L9E3UE3UE2UEU2EU7 ER4EUH
3LHLHLHL2HL8G2D3F4R2FRFR5ERBU9 N
GR6FRBR3NGR5NFBR3UER5ER6"
40 R2$="~~ERERD5GDG2LG2~~L6D3GNDLHUN
UERNFBENU2L2NGBE2HLUE2R2ER2EREBL
12BD8 NE2D6FREDF2NL2RF2DGND2GL3H
2UENEL2H4U6H3L3G3D2GD3FD2FDF4RFR
5F2R2E2REBLBH10 FDL5HUHNRUE3R2FD
4GL2H2ENEFREUNL2R"
50 HN$="U3H11L2H3RF2R2EU2FD4F2RE
D3F2R3FL2F3D4"
60 R$="NR2U8R5FD2GFD3L2U3HLND4BU
R2U2L2D2BR7BD5"
70 U$="NR4HU7R2D6R2U6R2D7GBR3"
80 D$="NR5U8BF2D4R2EU2HL2BH2R5F2
D4G2BR5"
90 O$="NR4HU6ER4FDBL2L2D4R2U4BR2
D5GBR3"
100 L$="NR6U8R2D6R4D2BR2"
110 P$="NR2U8R5BGL2D2R2U2BEFD2GL
3D4BR6"
120 H$="U8R2D3R2U3R2D8L2U3L2D3L2
"
130 ST$="U4NL2R2BR2BD4":SH$="U4B
R3D2NL3D2BR2":SE$="NR3U2NR2U2R3B
R2BD4":SR$="U2NRU2R3D2L2F2BR2":S
D$="NR2U4R2FD2GBR3":SN$="U4FDF2N
U4BR2":SU$="NU4R3NU4BR2":SL$="NU
4R3BR2"
140 SO$="BRNRHU2ERFD2GBR4":SS$="
NHREUL3UERFBR2BD3":SI$="NU4BR3":
SB$="BR6"
150 PMODE4,1:SCREEN1,1:PCLS:CIRC
LE(128,70),10,1:POKE178,1:PAINT(
128,70),,1
160 POKE178,3:DRAW"BM40,100S8;XS
R$;XSE$;XSS$;XSE$;XST$;XSB$;XSU$
;XSN$;XST$;XSI$;XSL$;XSB$;XSD$;X
SO$;XST$;XSB$;XSI$;XSS$;"
170 DRAW"BM36,120;XSR$;XSE$;XSD$
;XSB$;XST$;XSH$;XSE$;XSN$;XSB$;X
SH$;XSI$;XST$;XSB$;XSE$;XSN$;XST
$;XSE$;XSR$;"
180 EXEC44539
190 PMODE4,1:SCREEN1,1:PCLS
200 DRAW"BM108,110S8XR1$;XR2$;"
210 DRAW"BM127,50"+HN$:DRAW"BM14
3,50"+HN$
220 DRAW"BM20,150S16XR$;XU$;XD$;
XO$;XL$;XP$;XH$;"
230 DRAW"BM24,170S8XST$;XSH$;XSE
$;":DRAW"BM63,170XSR$;XSE$;XSD$;
":DRAW"BM102,170XSN$;XSO$;XSS$;X
SE$;XSD$;"
240 DRAW"BM164,170XSR$;XSE$;XSI$
;XSN$;XSD$;XSE$;XSE$;XSR$;"
250 POKE178,1
260 PAINT(23,143),,1:PAINT(62,14
7),,1:PAINT(102,144),,1:PAINT(13
8,146),,1:PAINT(172,146),,1:PAIN
T(188,146),,1:PAINT(220,146),,1
270 POKE178,3
280 PAINT(126,100),,1:PAINT(100,
60),,1:PAINT(164,54),,1':PAINT(1
34,84),,1:PAINT(138,68),1,1:PAIN
T(152,72),1,1
290 CIRCLE(155,66),2:CIRCLE(138,
66),1:CIRCLE(138,66),3:DRAW"BM16
0,90C0NL3GL2":POKE178,3:DRAW"BM1
60,90C0NL3GL2"
300 PLAY"XP1$;XP2$;"
310 POKE178,1:FORX=1TO6STEP2:CIR
CLE(159,83),X:NEXTX:POKE178,2
320 FORQ=1TO200:NEXTQ
330 SA$="ERFDNR4DGF2R2NF2G2NL4R6
NE2R4NH2R3EUBL3NL9UE3NFLG3L2H2NR
3HNR3NH4L2H2U2EREUNE2HNE2UHLU2R2
DREDGDENFR4FND3L3DNR3GNU2DNR2FG2
R4EUEL2DLUBFBRNHFR3NG2RDRFDL2HNE
GLUHNG3D2G2"
340 DR$="E4REUNR3NL10U2FR5E3H3NL
F3RDFGHLD3FDG2URU2L5HLG2L2GLDL"
350 SD$="C8L2ULU6HE2U3H2U2EU3F2R
10EU3ELHLURNDENUL2H2R3FENR2U3E3B
R3G4D2RERDG2DGD7G2D3F4DG4U2RE2H4
D3GD7FL2ULEU12G2L4HD2G3D6F2L"
360 SC$="NR5HUER2UNR4LU3RNR4U5NF
2HUERNF2EFR2U5L3D4L2HUER2UHU2BRB
D3R2E2U2H2ENULGDLULGRND2BUU2NU2R
5U2L3NL2ER3FDFR2F2GHEL4GRF3DFG5L
2DR5E3HG2L2E4D2F2ND4GDG2LNL7BD3N
L8ERNE2G2LD2NL5RD3L2NL4D3GL4HUER
2ULU5"
370 D1$="U5EU6H2URFUHL4BUR3F2UFR
```



Quick File

Managing Information
Storage And Retrieval

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SORT:	$2\frac{1}{4}$ min	210 min.
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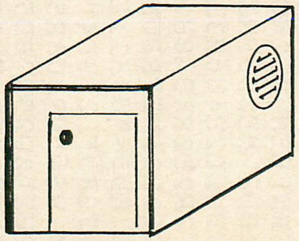

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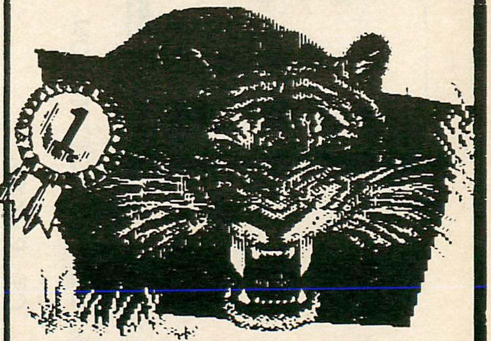

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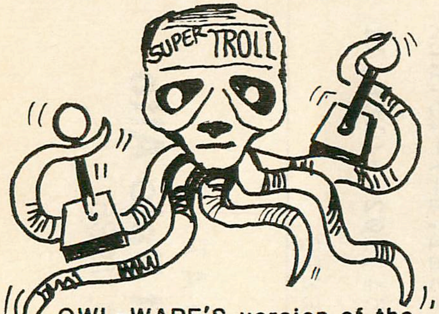

OWL-WARE'S version of the Distro (CRC) Controller by Tony DiStefano. This has sockets for 4 ROM Chips. ...only $5.00 additional with a Drive 0 System.

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OWL-WARE SOFTWARE

BUNDLE: DISK TUTORIAL
2 UTILITIES
2 GAMES

DISK TUTOR

LEARN EVERYTHING ABOUT DISK BASIC FROM THIS MACHINE LANGUAGE PROGRAM. THE TUTOR TAKES YOU STEP BY STEP THROUGH THE LESSONS AND CORRECTS YOUR MISTAKES A MULTI-LESSON TUTORIAL THAT WILL GIVE YOU QUICK, PAINLESS KNOWLEDGE OF DISK BASIC (THIS PROFESSIONALLY WRITTEN TUTOR IS EASILY WORTH THE BUNDLE'S TOTAL PRICE).

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```
BLDLURBRRDGL2FDFD2E5DLDG2DG2D4GF
2D4FL2U4H2GD4FL2U6EHR"
380 D2$="U2E2HU2NHR5E3U2NH2BR2NU
2G2RFRDL2G2RFER2F2D2G2L2H2U2EFUL
7F2G2FL2UE2H2DG3FL"
390 T1$="NR9EUEU13BR3UNEL2GL8GL3
HLH2LUE2R2ER5ER3FU3HLHL4HER2EHLH
LHR3ER5FR3FR4FDGFRFDG2R2FDL5H2LG
D2FR5FR4FRFDGL4GL2HL2H2D11FD3FRF
"
400 T2$="NR2U13HD2G2L3GL3GL4E2R2
ERE3REUL2GL2GLGL2ERUEREUR3E5L3G3
LGL2E6R2UE2UG3L2E5UG3LEUEUEUEUEU
EFDFD2FDF2L2H2DFDRF3RGL4FRFRF3L4
H2LHD2RFRF2RDRF3L2HLHL2HLHD2FRFR
2FRFRFRF2RFL8HL4HLNH2D11"
410 PMODE4,1:SCREEN1,1:PCLS
420 DRAW"BM50,150S8;XD1$;":DRAW"
BM90,160;XD2$;":PAINT(114,156),1
,1:POKE178,155:PAINT(52,146),,1:
PAINT(100,148),,1:POKE178,3
430 CIRCLE(160,140),10:CIRCLE(16
0,124),7:CIRCLE(160,114),4:PAINT
(160,138),1,1:PAINT(160,122),1,1
:PAINT(160,114),1,1
440 CIRCLE(158,114),1,0:CIRCLE(1
62,114),1,0:CIRCLE(160,122),1,0:
CIRCLE(160,126),1,0:CIRCLE(160,1
38),1,0:CIRCLE(160,142),1,0
450 DRAW"BM156,124H2L2H2BR18BDGL
G2NR5L3"
460 DRAW"BM154,110R2U3R2D3NL2R2"
470 DRAW"BM16,124S4;XT1$;":DRAW"
BM40,110;XT1$;":DRAW"BM186,120;X
T1$;":DRAW"BM210,174S8;XT2$;"
480 POKE178,2:PAINT(212,142),,1:
PAINT(188,100),,1:PAINT(18,100),
,1:PAINT(44,84),,1
490 FORQ=1TO20:X=RND(255):Y=RND(
90):CIRCLE(X,Y),1,1:NEXTQ
500 PLAY"XP1$;XP2$;"
510 FORX=1TO2:CIRCLE(71,126),X,1
:NEXTX
520 GET(67,124)-(73,130),S,G
530 Y=124:FORX=67TO156STEP2:PUT(
X,Y)-(X+6,Y+6),S,PSET:Y=Y-.5:NEX
TX
540 COLOR0:LINE(154,102)-(166,11
0),PSET,BF
550 FORQ=1TO200:NEXTQ
560 PCLS:PMODE3,1:SCREEN1,1:PCLS
1
570 COLOR6:LINE(0,0)-(255,78),PS
ET,BF
580 DRAW"BM81,140S8"+SD$:PAINT(9
0,112),8,8
590 DRAW"BM161,140S8XSC$;":PAINT
(178,100),7,8:PAINT(178,118),5,8
:PAINT(178,112),7,8:PAINT(178,12
4),7,8:PAINT(178,138),6,8:PAINT(
164,136),6,8
600 DRAW"BM104,86C6E":DRAW"BM96,
89S4C7HGFE"
610 DRAW"BM226,118C6"+T2$:DRAW"B
M30,180S8"+T2$:POKE178,1:PAINT(3
5,150),,6
620 FORX=1TO30:CIRCLE(RND(255),R
ND(80)),RND(2),1:NEXT
630 PLAY"XP4$;XP5$;"
640 PCLS:PMODE4,1:SCREEN1,1
650 DRAW"BM50,40S4"+DR$:DRAW"BM7
0,40"+DR$
660 DRAW"BM90,40"+DR$:DRAW"BM110
,40"+DR$
670 DRAW"BM24,34"+SA$:POKE178,1:
PAINT(32,38),,1:POKE178,3
680 DRAW"BM40,170S4C1;XT1$;":DRA
W"BM80,176;XT2$;":DRAW"BM116,180
;XT2$;"
690 DRAW"BM130,170;XT2$;":DRAW"B
M150,182;XT2$;"
700 DRAW"BM0,118S8E10RE6NE3F2EF3
E2NH5F12DF5R3FR8F2R2F2R3FR2":DRA
W"BM158,154R10FR5FR40H10LH2LH6G8
L2G2NG6H4LHLHG4LG5"
710 DRAW"BM198,170S4;XT2$;":DRAW
"BM216,166;XT2$;":DRAW"BM232,188
;XT2$;"
720 PAINT(38,84),1,1:POKE178,2:P
AINT(40,150),,1:PAINT(80,156),,1
:PAINT(130,150),,1:PAINT(232,168
),,1:PAINT(198,150),,1:PAINT(130
,134),,1:PAINT(232,152),,1:POKE1
78,3:PAINT(198,134),,1
730 FORQ=1TO30:X=RND(255):Y=RND(
100):PSET(X,Y):NEXTQ
740 PLAY"XP1$;XP3$;"
750 POKE65495,0:GET(20,22)-(130,
42),R,G:FORX=20TO140STEP2:PUT(X+
2,22)-(X+112,42),R,PSET:PLAY"T12
0O5BBB":NEXTX
760 FORZ=1TO56:GET(140,22)-(252,
42),R,G:PUT(142,22)-(254,42),R,P
SET:NEXTZ:POKE65494,0
770 PLAY"T3O2L4DGL8GAGF+L4EEEAL8
ABAGL4F+DDBL8BO3CO2BAL4GEL8DDL4E
AF+L1G"
780 GOTO780
```

See You AT
RAINBOWfest Palo Alto
Feb. 14-16, 1986

The Rainbow's

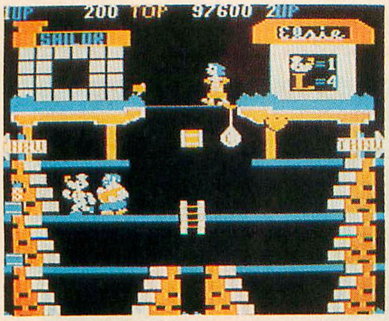
Holiday Shopping Guide

NEED A HOLIDAY GIFT FOR THAT SPECIAL COCO ENTHUSIAST?

We here at THE RAINBOW have taken special care to select some great Color Computer gift ideas. And we've brought them all together to help you through the maze of holiday shopping for the CoCo lover in your life.

There are many useful and just plain fun products in this special Holiday Shopping Guide — all of interest to CoCo owners — and we're sure there's at least one item (if not more) that's perfect for your gift-giving needs.

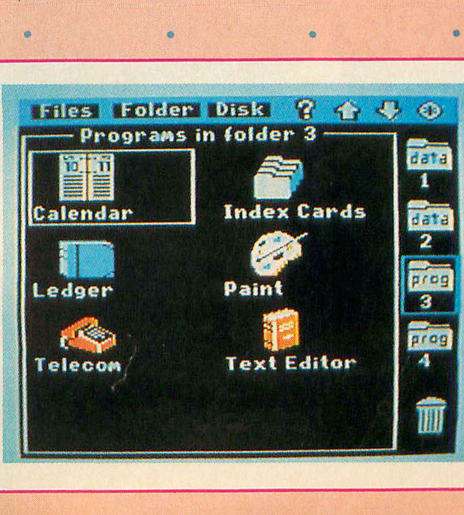
Here's one for the nimble-fingered, quick-witted game lover. *The Sailor Man* pits our hero against Bigfatbadguy for the heart of the fair Elsie. From Tom Mix Software, cassette $29.95, disk $34.95, requires 64K.

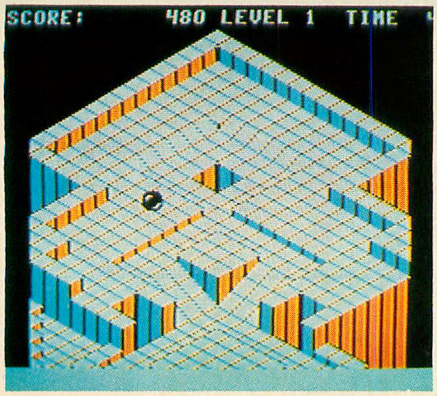

1UP 200 TOP 97600 2UP
SAILOR
Elsie
L=4

A must-have for any game-loving CoCo owner is a deluxe joystick. Pictured is the Mach II, available from Spectrum Projects, Inc., $39.95.

For computer-aided education, Tandy Corporation offers many programs for use with the Electronic Book, such as *Solar Explorer*. The Electronic Book is available in Radio Shack stores nationwide, $19.95. (See Steve Blyn's article on Page 30.)

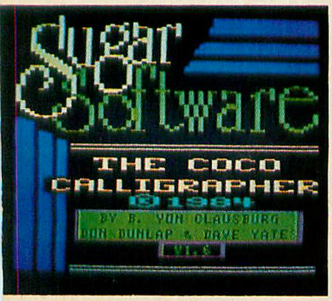
Put a complete work station at your CoCo owner's fingertips with *DeskMate*, a comprehensive package of six applications, including word processing, spreadsheets and telecommunications. Available in Radio Shack stores nationwide, $99.95, requires 64K and disk drive.


Files
Folder
Disk
Programs in folder 3
Calendar
Index Cards
Ledger
Paint
Telecom
Text Editor
data 1
data 2
prog 3
prog 4


SCORE: 480 LEVEL 1 TIME

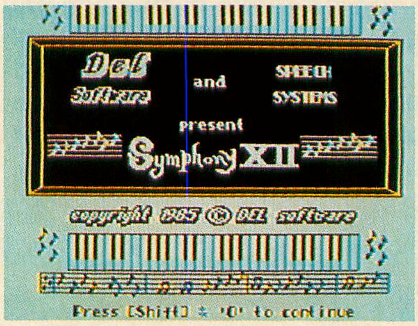
Here's an arcade game favorite for your favorite CoCo owner. *Marble Maze* needs a joystick and quick reflexes to guide a marble through a maze filled with monsters, acid-puddles and electric snakes. From Diecom Products, $28.95, requires 64K.

For CoCo enthusiasts with programming ambitions, there's hands-off ease with EARS from Speech Systems, $99.95


Sugar Software
THE COCO CALLIGRAPHER
©1984
BY B. VON CLAUSBURG
DON DUNLAP & DAVE YATES
V1.5

Need a perfect gift for the "printer's devil"? *CoCo Calligrapher* allows your Gutenberg and his CoCo to produce typescripts for all occasions in a variety of fonts. Available from Sugar Software, cassette $24.95, disk $29.95.

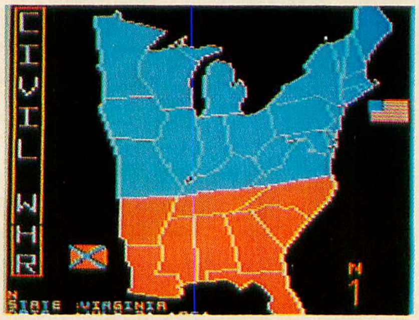
Got a budding composer on your gift list? Give your music lover *Symphony 12* music synthesizer to make a CoCo sound like any of 10 preset instruments in 12 voices! From Speech Systems, $79.95.


Del Software
and
SPEECH SYSTEMS
present
Symphony XII
copyright 1985 © DEL software
Press [Shift] & '0' to continue

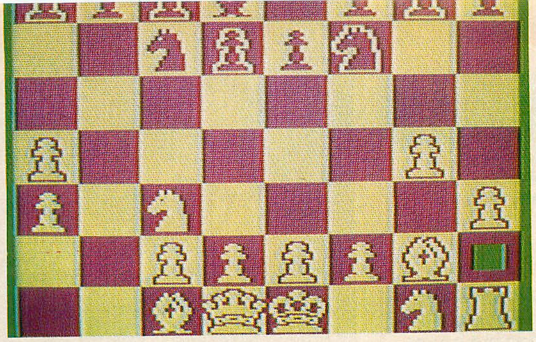
**This lucky CoCo 2
has a friend that's true blue
To keep it cool
While playing school
It's REM's CoCo Cooler Too!**

CoCo Cooler Too from REM Industries, Inc., $44.95. *Count to 100* from CY-BURNET-ICS, $29.95.

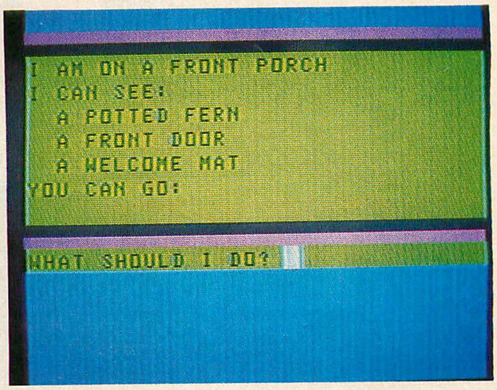
COUNT TO
100


CIVIL WAR
STATE :VIRGINIA
M
1

Shopping for a Simulations aficionado? *The Rainbow Book of Simulations* features award-winning programs, such as *Civil War*, which puts you in the role of Commander-in-Chief of the Confederate Army during the war between the states. Available from The Rainbow Bookshelf, book $9.95, tape $9.95.



The perfect gift for a chess-playing CoCo owner is *Cyrus World Class Chess*. This state-of-the-art program offers the challenge of tournament conditions as well as analysis options to help sharpen playing strategies. Available in Radio Shack stores nationwide, $39.95.

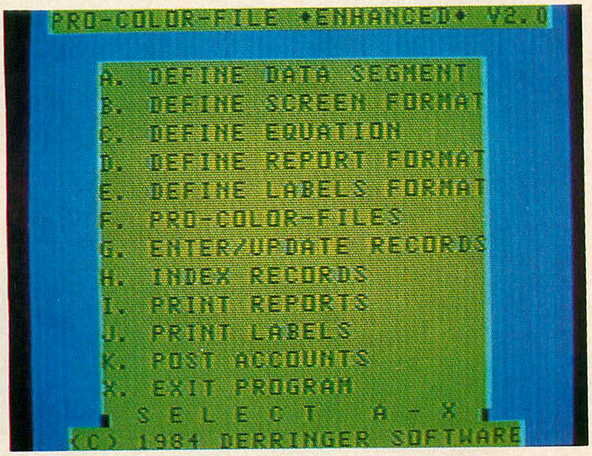


```
I AM ON A FRONT PORCH
I CAN SEE:
  A POTTED FERN
  A FRONT DOOR
  A WELCOME MAT
YOU CAN GO:

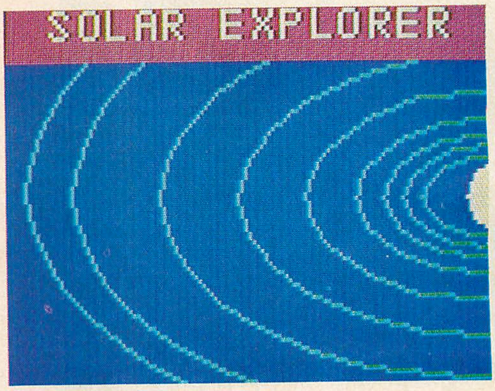
WHAT SHOULD I DO?
```

For a neophyte Adventurer, there's *Adventure Starter*, which comes in a talking version to help introduce one to the wonderful world of Adventure games. Available from Owls Nest Software, $17.95.

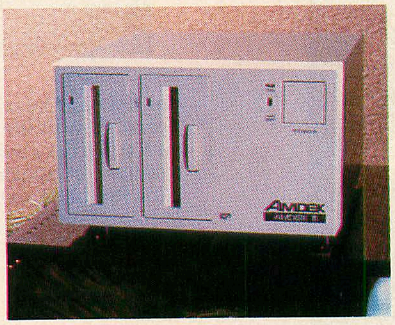
For the efficiency-minded CoCo owner, there's *Pro-Color-File* (enhanced Version 2.0), a serious database program that even boasts its own support group of satisfied users. Available from Derringer Software, $59.95.



```
PRO-COLOR-FILE *ENHANCED* V2.0
  A. DEFINE DATA SEGMENT
  B. DEFINE SCREEN FORMAT
  C. DEFINE EQUATION
  D. DEFINE REPORT FORMAT
  E. DEFINE LABELS FORMAT
  F. PRO-COLOR-FILES
  G. ENTER/UPDATE RECORDS
  H. INDEX RECORDS
  I. PRINT REPORTS
  J. PRINT LABELS
  K. POST ACCOUNTS
  X. EXIT PROGRAM
     S E L E C T   A - X
(C) 1984 DERRINGER SOFTWARE
```

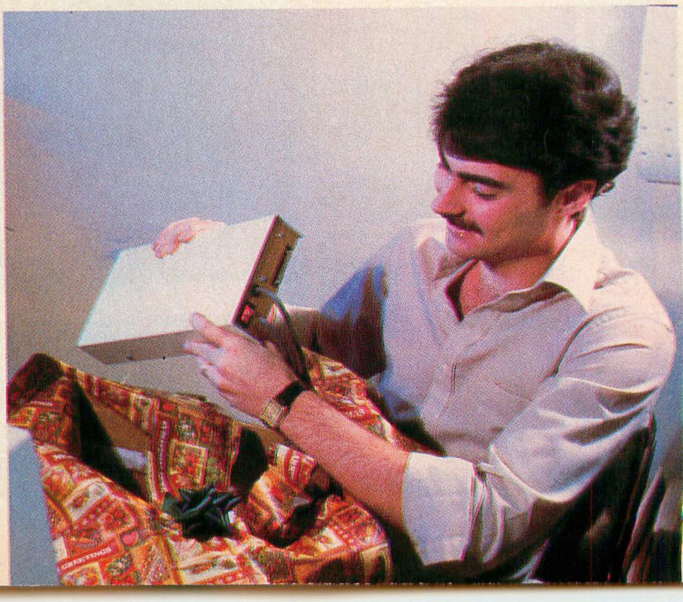


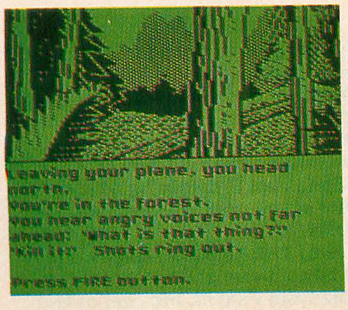
Shopping for a young astronomer? *Solar Explorer* shows and tells all the facts about the planets and moons in the Solar System. Available in Radio Shack stores nationwide, $19.95, requires 32K and Electronic Book.



Pictured with the HJL-57 Keyboard are Amdek's Dual three-inch drives. Check the pages of THE RAINBOW for our advertisers offering these drives on sale.

Delight your CoCoist with the new JDOS drive system. Comes with cable and manual from J&M Systems, $289.

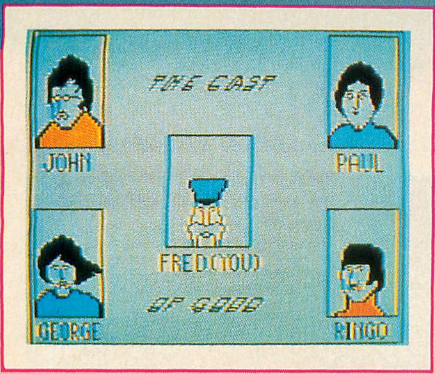




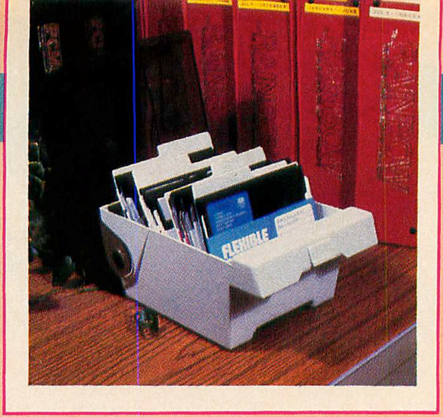
```
Leaving your plane, you head
north.
You're in the forest.
You hear angry voices not far
ahead: "What is that thing?"
"Kill it!"  Shots ring out.

Press FIRE button.
```

A joystick-driven Adventure with hundreds of thrilling situations awaits your CoCoist in the illustrated chapters of *War of the Worlds*. Available from Triad Pictures Corp., package of three chapters, $39.95, requires 64K and a Radio Shack-type joystick.

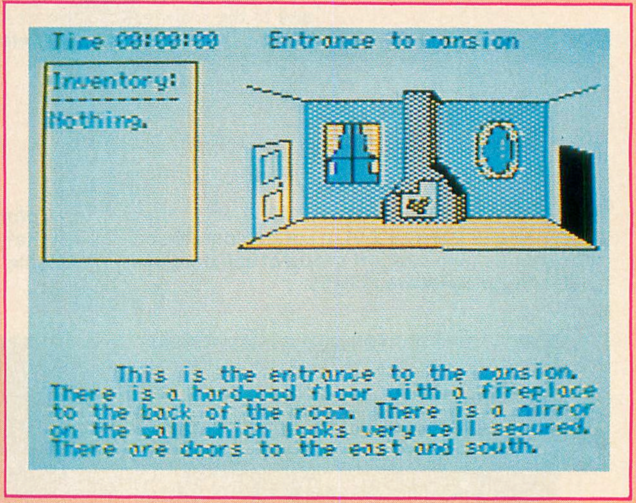


Just in time for holiday gift-giving — *The Second Rainbow Book of Adventures*. Twenty-four exciting Adventures await your CoCoist, such as the musical *Yellow Submarine*. Available from The Rainbow Bookshelf, book $13.95, tape $13.95.



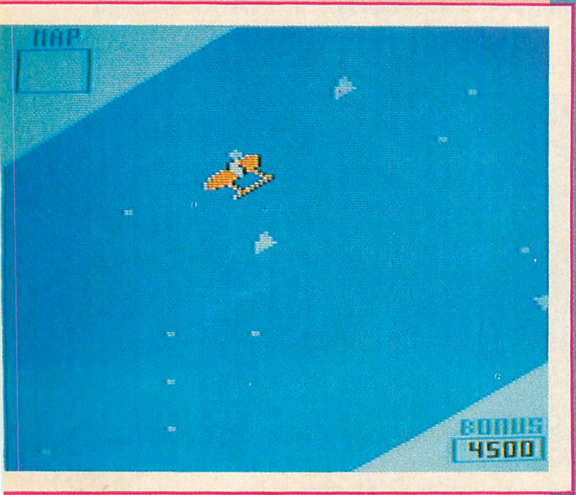
Here's one gift suggestion we know will be a hit. Always useful, always welcome are diskette storage boxes, such as this one from Tandy Corp., available in Radio Shack stores nationwide, $14.95.

Here's an Adventure with Hi-Res graphics complex enough to test the heartiest Adventurer on your list. *To Preserve Quandic* involves parallel universes, time machines and mad scientists. On two disks from Prickly-Pear Software, requires 32K and disk drive, $39.95.

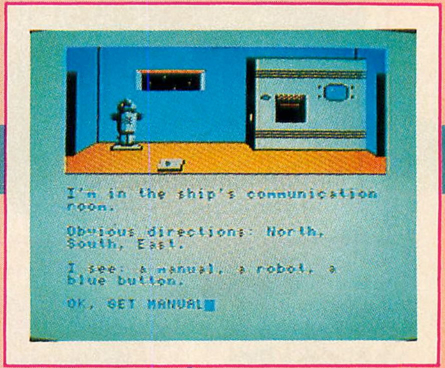


```
Time 00:00:00     Entrance to mansion
Inventory:
Nothing.

  This is the entrance to the mansion.
There is a hardwood floor with a fireplace
to the back of the room. There is a mirror
on the wall which looks very well secured.
There are doors to the east and south.
```



Professor Chance takes the CoCo Adventurer on a hazardous quest for the Great Secret of the Erebus Islands. The suspense is marvelous and the treasure glorious in *Ghana Bwana*. Available from Radio Shack stores nationwide, disk $29.95, requires 64K.



```
I'm in the ship's communication
room.

Obvious directions: North,
South, East.

I see: a manual, a robot, a
blue button.

OK, GET MANUAL█
```

For the bold Adventurer in your life, there's *Trekboer* with the challenge to save all life on Earth from a deadly virus by combing the frontiers of space for a cure. From Mark Data Products, cassette $24.95, disk $27.95, requires 32K.

RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
RAINBOW
ON TAPE
1985
RAINBOW
OUR HOLIDAY ISSUE

Here's a "family" grouping of products that will delight any CoCo owner.

The HJL-57 Keyboard is engineered for easy installation and comes with a one-year warranty, available from HJL Products, $79.95.

Supporting a Gorilla Green Screen monitor, available from Spectrum Projects for $99.95, is a 19-inch monitor stand from Howard Medical Computers, $39.50.

To keep issues of THE RAINBOW neatly and conveniently at hand, there are THE RAINBOW binders, available from Falsoft, Inc., set of two $13.50.

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- Programmable Word Length, Parity and Stop Bits
- Save and Load Text Buffer and Program Key Buffers to Tape or Disk
- 9 Hi-Resolution Display Formats, 28 to 255 x 24
- True Upper/lower Case Display
- Kill Graphics Option for an Extra 6K
- Supports Line Break
- Freeze Display and Review Information On Line
- Send Files Directly from Buffer or Disk
- Full Disk Support for Disk Version
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- Separate Printer Baud Rates 110-9600
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- 9 Programmable Function Key Variable Length Macro Buffer
- Programmable Prompt Character or Delay to Send Next Line
- Programmable Control Character Trapping
- Programmable Open/Close Buffer Characters
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- Program and Memory Status Displays

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- Built in Disk Directory and Kill file commands.
- Menu display with single key commands for smooth, Easy, almost foolproof operation.

32K Disk $34.95

Starship Falcon

Graphics Adventure Game

Six months ago a terrorist group demanded to be designated the rulers of Alpha Sigma III, under the threat of world starvation on the planet Earth. The Federation denied their demands, so they released a biological weapon which has destroyed all known edible plant species from throughout the known galaxy. To date no plant life has been able to survive on Earth. Recently, Federation undercover agents have reported a story told by a roving space trader, of a planet with abundant edible plant life. These plants have a reputation of being able to survive in all climates and in fact, are supposed to grow at an incredible rate. The Federation is desperate! If Earth's food source is not replaced soon, the Federation will have to evacuate all animal and Human life. Your mission is to go to the planet Zephyr and obtain the seed of these plants and return to Earth. Several Federation agents have been sent to obtain the seeds and none has returned! Can you get the seed and survive??? GOOD LUCK!

32K Disk $21.95

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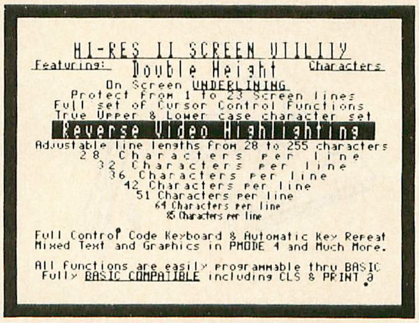

```
              HI-RES II SCREEN UTILITY
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Adjustable line lengths from 28 to 255 characters
        2 8  C h a r a c t e r s  p e r  l i n e
          32 Characters per line
           36 Characters per line
            42 Characters per line
             51 Characters per line
              64 Characters per line
               85 Characters per line

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```

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Screen Enhancement Program Comparison Chart

PROGRAM FEATURES	HI-RES II NEW	HI-RES I OLD	BRAND X
Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Biack	Buff/Black	Buff/Black
X.Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16.32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

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Working With The Electronic Book
Part 2

By Steve Blyn
Rainbow Contributing Editor

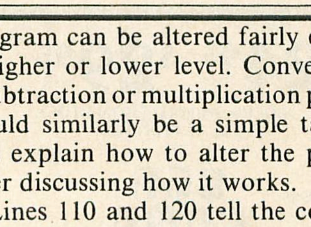
This month we present the second of a two-part series on Radio Shack's Electronic Learning Book. Last month, we described how to use this new peripheral; in this installment, we will demonstrate a practical educational application for it.

Just to review briefly, it is our contention that the Electronic Book is a wonderful idea and a pleasure to use with certain students. These include the preschool set and many physically disabled individuals. Both of these groups often have motor dexterity problems and find it difficult to use the computer's keyboard. The Electronic Book offers them an alternative means of entering data. It is also useful for those who thrive and learn best through a new medium.

It was difficult narrowing down to just one subject area to demonstrate the book's use. We feel that Radio Shack often makes the decision to direct their CoCo software almost exclusively to younger children. This decision has caused hoards of overpriced Apples and even TRS-80 Model IIIs to be purchased by middle school classrooms instead of the better and less expensive CoCo.

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, N.Y.)

We felt on safe ground with an arithmetic program. The level chosen is two-digit addition examples. This is often taught in second and third grades. The program can be altered fairly easily to a higher or lower level. Converting to a subtraction or multiplication program would similarly be a simple task. We will explain how to alter the program after discussing how it works.



Lines 110 and 120 tell the computer to check the right joystick port values, `JOYSTK(0)` and `JOYSTK(1)`. These values are read in and altered by pressure on the Electronic Book's surface. Lines 130-220 read the joystick values to determine if any of the numbers have been pressed. When a number is pressed, it is drawn by Line 250 and a tone is played on Line 260. Since the answers are all two digits, this process is repeated twice by the `FOR/NEXT` loop created by lines 80 and 300.

Line 310 checks to see whether the child's answer is correct. If correct, a happy tune is played. If incorrect, the real answer is converted to strings and drawn underneath the example by lines 320-370. A pause in the action occurs, then it goes back to Line 70 for the next example.

No scorecard is included in this program as we are concerned mainly with getting our user to become familiar and then comfortable with the apparatus. No timer or limit on the number of examples was included for the same reason. Please feel free to add any of these enhancements as you see fit for your own purposes.

This program can easily be converted to a different degree of difficuly. The numbers in the examples are randomly chosen on Line 640. 'Q' and 'S' are the 10's place digit values. 'R' and 'T' are the unit's place digit values. In our pro-

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NOW LABELIII IS AVAILABLE ON DISK!

LABELIII - (Reviewed in Nov 83 Rainbow) With LABELIII you can develop and maintain a mailing list. Print lists or mailing labels in your choice of 1, 2, or 3 wide. Supports 3 or 4 line addresses with phone optional. Sort by last name, first name or zip code.
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PROGRAM FILE - (rev Oct 83 Rainbow) Organize your programs. With PROGRAM FILE you create a file of your computer programs. You can search, sort, add, modify, delete, save to tape and display on the screen or send to a printer.
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DATA MANAGEMENT PACKAGE - Save $$ Take the three above on disk or tape (specify) for only $40.00 Postpaid

ESPIONAGE ISLAND ADVENTURE - (reviewed in June 84 Rainbow) You have been dropped off on an island by submarine. You must recover a top secret microfilm and signal the sub to pick you up. Problems abound in this 32K EXT adventure.
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gram, we arranged their random values so the sum of the two two-digit numbers does not exceed 98. This means we will always have a two-digit answer. You may change the level of difficulty by altering these values. You would, of course, also adjust the value of YY in Line 80 for the proper number of digits in the answer.

The program can easily be changed for other arithmetic operations. "AN" is the answer the program is looking for. It is computed on Line 660. The answer in our example is `AN = (Q*10)+R+(S*10)+T`. To change to a subtraction program, for example, change Line 660 to read `AN=((Q*10)+R)-((S*10)+T)`. You should also be careful to keep the value of 'Q' larger than 'S' to avoid negative answers.

Last month, we challenged those readers who also have a Tandy 1000. Although not designed to work on the Tandy 1000, the Computer Island staff found the Electronic Book works fairly well on it. The joystick values are, of course, different. Our challenge was for you to determine those values. The answers are as follows:

AN = 1 if A = 26 and B = 10
AN = 2 if A = 2 and B = 10
AN = 3 if A = 17 and B = 11
AN = 4 if A = 24 and B = 12
AN = 5 if A = 44 and B = 12
AN = 6 if A = 65 and B = 12
AN = 7 if A = 14 and B = 28
AN = 8 if A = 14 and B = 3
AN = 9 if A = 14 and B = 16
AN = 10 if A = 14 and B = 24

The Tandy 1000 also uses the left rather than the right joystick port at the front of the computer. Joystick, incidentally, is called `STICK` on the Tandy 1000 rather than `JOYSTK`.

In conclusion, we feel the Electronic Learning Book can be a valuable educational aid to many. We hope we have helped to convince you to pursue this avenue and, also, that Radio Shack continues to support this device. ☐

190 27
410 168
END 4

The listing: `ADDITION`

```
10 REM"ADDITION WITH THE ELECTRO
NIC BOOK"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
30 DIM E$(10)
40 CLEAR2000
50 FY=RND(-TIMER):REM"RANDOMIZE"
60 GOSUB 400
70 GOSUB 590:RA=0
80 FOR YY= 1 TO 2
90 N=0
100 X=A:Y=B
110 A=JOYSTK(0)
120 B=JOYSTK(1)
130 IF A=63 AND B=0 THEN N=1:DB$
=E$(1)
140 IF A=53 OR A=52 AND B=0 THEN
 N=2:DB$=E$(2)
150 IF A=41OR A=42 AND B=0 THEN
N=3:DB$=E$(3)
160 IF A=8 AND B=0 THEN N=4:DB$=
E$(4)
170 IF A=19 AND B=0 THEN N=5:DB$
=E$(5)
180 IF A=30 AND B=0THENN=6:DB$=E
$(6)
190 IF A=0 AND B=63 THEN N=7:DB$
=E$(7)
200 IF A=0 AND B=52 THEN N=8:DB$
=E$(8)
210 IF A=0 AND B=40 THEN N=9:DB$
=E$(9)
220 IF A=0 AND B=7 THEN N=10:DB$
=E$(10)
230 IF N<1 THEN 110
240 IF RA=0 THEN RR=150 ELSE RR=
130
250 DRAW"C7BM"+STR$(RR)+",110"+D
B$
260 PLAY"O4L8CDE"
270 IF RA=0 THEN GU=N:IF GU=10 T
HEN GU=0
280 RA=1:GG=(N*10)+GU
290 REM"GG IS THE CHILD'S ANSWER
"
```

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```
300 NEXT YY
310 IF GG=AN THEN PLAY"O3L20CDEF
GCDEFG":GOTO 380
320 REM"DRAW THE CORRECT ANSWER"
330 AN$=STR$(AN)
340 A2$=LEFT$(AN$,2):M=VAL(A2$)
350 A1$=RIGHT$(AN$,1):N=VAL(A1$)
:IF N=0 THEN N=10
360 DRAW"BM130,160"+E$(M)
370 DRAW"BM150,160"+E$(N)
380 FOR T=1 TO 3000:NEXT T
390 GOTO 70
400 REM"THE LETTERS AND NUMBERS
NEEDED ARE DRAWN HERE"
410 A$="BEHUNU2R4NU2DGL2BGBL6"
420 D$="BEHU2ER3D4L3BGBL6"
430 I$="BR2BUU4BU2BD7BL8"
440 N$="BUU4F4U4BG5BL5"
450 O$="BEHU2ER2FD2GL2BGBL6"
460 T$="BUR2NU4R2BDBL10"
470 E$(10)="BEHU2ER2FD2GL2BGBL6"
480 E$(1)="BE2NU3DEBFBGBL9"
490 E$(2)="BENR3HER3U2L4BG5BL"
500 E$(3)="BENR3HENR2HER3BG5BL5"
510 E$(4)="BENU4E3L4BG4BL2"
520 E$(5)="BER4U2L3HER3BG5BL5"
530 E$(6)="BU2FR2EU2NHGL2HER2BG5
BL4"
540 E$(7)="BUNR4UE3BG5BL4"
550 E$(8)="BER2EHEHL2GFNR2GFBGBL
6"
560 E$(9)="BER2EHL2GNFU2ER2FBG4B
L6"
570 SP$="BE4BUBG5BL5":'*SPACER
580 RETURN
590 PCLS:PMODE3,1:SCREEN1,1:PCLS
5
600 COLOR6:LINE(20,25)-(235,152)
,PSET,B
610 LINE(15,20)-(240,157),PSET,B
620 PAINT(17,22),7,6
630 DRAW"S12A2BM65,2"+A$+D$+D$+I
$+T$+I$+O$+N$
640 Q=RND(4):R=RND(9):S=RND(4):T
=RND(9)
650 REM"THE ANSWER"
660 AN=(Q*10)+R+(S*10)+T
670 DRAW"C6BM130,50"+E$(Q)
680 DRAW"BM150,50"+E$(R)
690 DRAW"BM130,80"+E$(S)
700 DRAW"BM150,80"+E$(T)
710 LINE(85,90)-(95,90),PSET:LIN
E(90,85)-(90,95),PSET
720 LINE(85,100)-(170,102),PSET,
BF
730 RETURN
```

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By Bernie Litton

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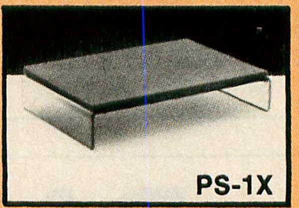

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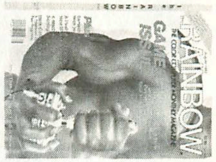

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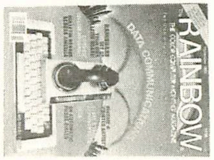

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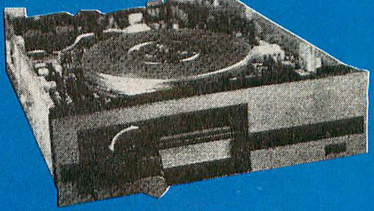

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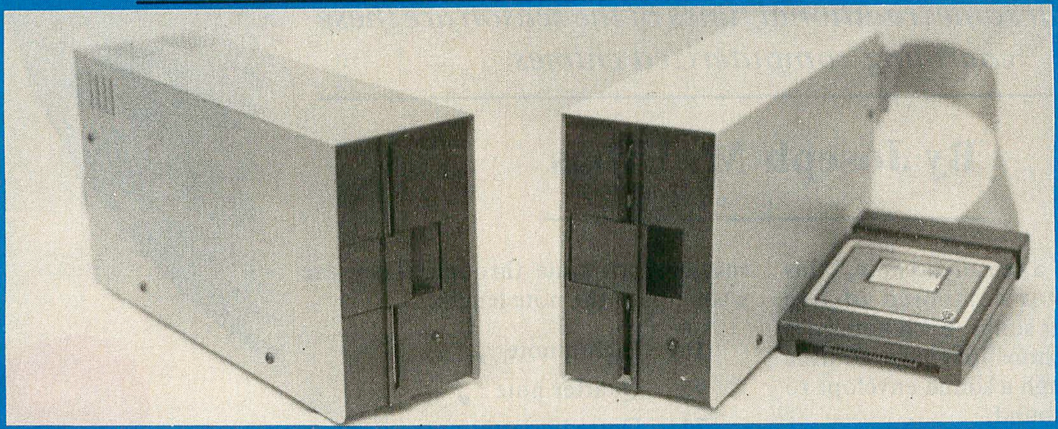

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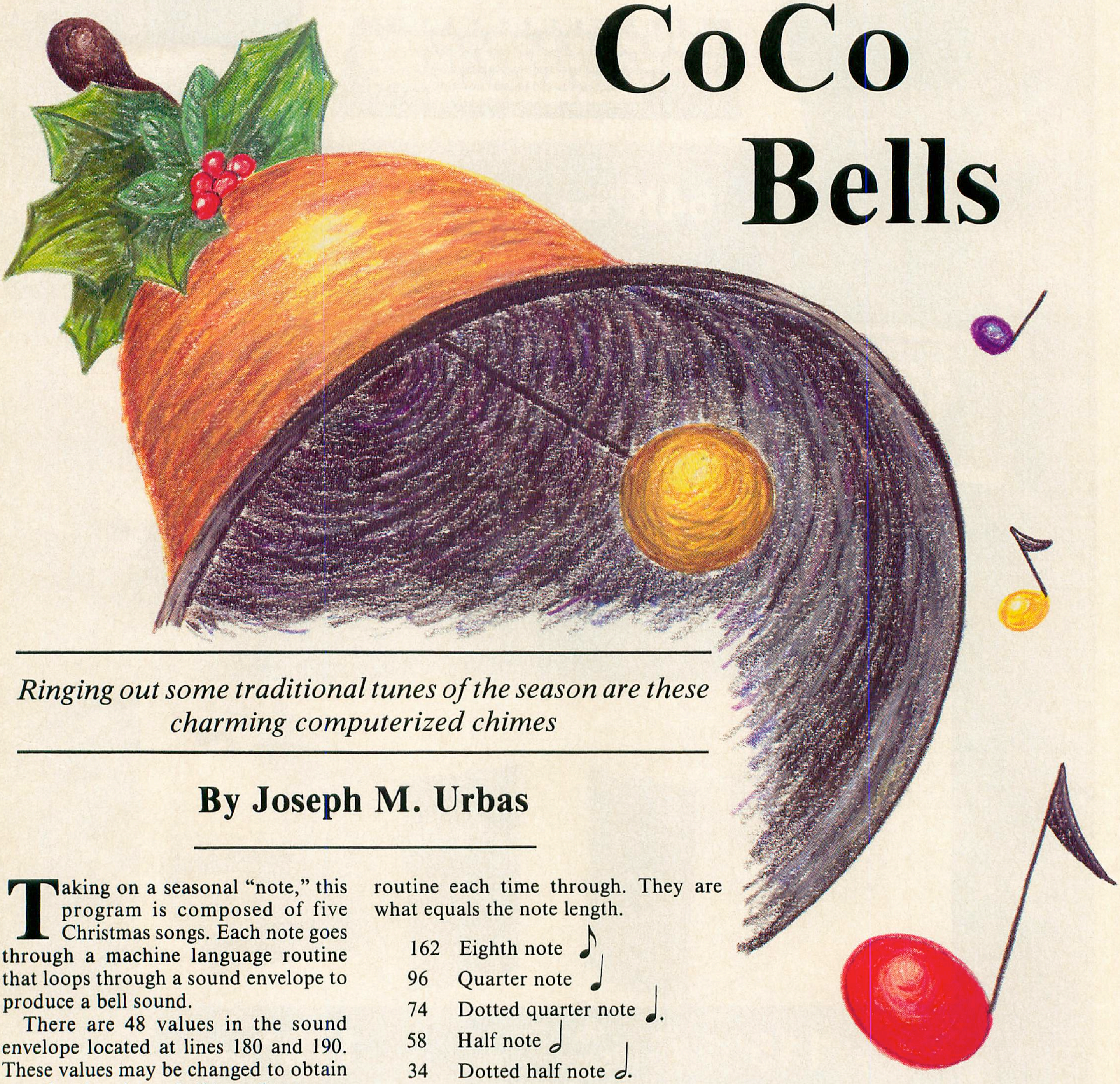


Ringing out some traditional tunes of the season are these charming computerized chimes

By Joseph M. Urbas

Taking on a seasonal "note," this program is composed of five Christmas songs. Each note goes through a machine language routine that loops through a sound envelope to produce a bell sound.

There are 48 values in the sound envelope located at lines 180 and 190. These values may be changed to obtain sounds other than a bell tone, but to run the songs I've typed in, the values in lines 180 and 190, which are 162, 96, 74, 58, 34 and 0, must remain that value and in the same location. These values are what terminate the machine language routine each time through. They are what equals the note length.

162	Eighth note ♪
96	Quarter note ♩
74	Dotted quarter note ♩.
58	Half note 𝅗𝅥
34	Dotted half note 𝅗𝅥.
0	Whole note 𝅝

Example: If a whole note is being played, the machine language routine continues till it reaches a '0' in the sound envelope. If a half note is being played, the machine language routine continues till it reaches a '58' in the sound envelope.

Lines 90-110: Turn on the digital-to-analog converter and output the sound to the television speaker.

(Joe Urbas has two drives, cassette, modem, printer and a 64K Color Computer with ADOS. He lives in Cecil, Pa., and enjoys the computer as one of his hobbies.)

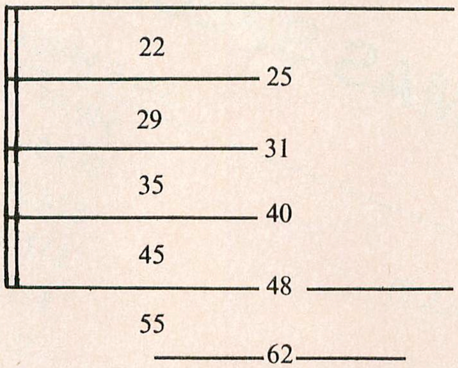
Lines 120-170: The machine language routine that is poked into memory locations $3600-$365A to loop through a sound envelope poked in at memory locations $365B-$368A.

Lines 230-380: This is the menu, choice, direct to play and return to menu.

Lines 460-1340: Data is read and poked into memory locations $368B and $365A to be found by the machine language routine when the USR function is called.

Data is read and poked two per cycle, 'F', the note and 'D', the length of the note.

'F' — The Notes



Flats and sharps are between these values, 51, 42, 38, 33 and 27.

'D' — The Note Length

These are 162, 96, 74, 58, 34 and 0, as previously explained. However, you may change all of the values in the sound envelope in lines 180 and 190, but you must also change the note length value in the data line of your song to its own unique value.

The third value in Line 200 controls the speed that the song moves; it may be changed to whatever you prefer.

(Questions about *Christmas Songs* may be directed to the author at RD 1 Box 238, Windcrest Dr., Cecil, PA 15321, phone 412-746-4537. Include an SASE when writing.) ☐

180	152
400	61
560	243
740	151
880	0
1050	150
1200	208
END	77

The listing: XMASONGS

```
10 '************************
20 '*   JOSEPH M. URBAS    *
30 '*   107 VINE STREET    *
40 '*   CANONSBURG, PA.    *
50 '*        15317         *
60 '*    412-746-4537      *
70 '************************
80 GOTO 1340
90 POKE&HFF01,(PEEK(&HFF01)AND &
HF7)
100 POKE&HFF03,(PEEK(&HFF03)AND
&HF7)
110 POKE&HFF23,(PEEK(&HFF23)OR &
H08)
120 FOR X=&H3600 TO &H368F
130 READ Z: POKE X,Z
140 NEXT X
150 DATA 26,80,206,54,139,174,65
,191,54,88,174,67,166,159,54,88,
177,54,90,39,66,198,128,61,132,2
52,183,255,32
160 DATA 230,196,48,31,38,12,16,
190,54,88,49,33,16,191,54,88,174
,67,90,38,237,166,159,54,88,18,1
8,198,128,61
170 DATA 132,252,127,255,32,230,
196,48,31,38,12,16,190,54,88,49,
33,16,191,54,88,174,67,90,38,237
,32,181,57,0,0,0
180 DATA60,95,230,95,47,81,162,7
1,35,62,124,55,27,48,96,42,21,37
,74,33,17,29,58,26,13,23
190 DATA46,20,10,15,34,14,7,12,2
4,10,5,8,16,7,3,6,12,5,10,1,10,0
200 DATA 0,54,91,11,0
210 RESTORE
220 DEFUSR=&H3600
230 CLS
240 PRINT@68,"1. SILVER BELLS
250 PRINT@132,"2. THE FIRST NOEL
260 PRINT@196,"3. HARK! THE HERA
LD"
270 PRINT@234,"ANGELS SING"
280 PRINT@260,"4. O COME, ALL YE
 FAITHFUL"
290 PRINT@324,"5. WE WISH YOU A
MERRY"
300 PRINT@362,"CHRISTMAS"
310 PRINT@423,"CHOOSE NUMBER?"
320 A$=INKEY$:IF A$="" THEN320
330 IF A$<CHR$(49) OR A$>CHR$(53
) THEN310
340 K=VAL(A$)
350 PRINT@437,K
360 ON K GOSUB 390,630,800,970,1
140
370 RESTORE
380 A$=INKEY$:GOTO310
390 '*****SILVER BELLS*****
400 FOR W=1TO144
410 PRINT@0,W
```

CHRISTMAS SPECIALS

PROGRAM	SALE PRICE	SAVINGS
PRO-COLOR-FILE	$49.95	$10.00
PRO-COLOR-SERIES (ALL 3)	$69.95	$41.90
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Prices good November 15, 1985 thru January 15, 1986
No other discounts apply

PRO-COLOR-FILE

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$59.95

The first serious database program available for the Color Disk System and, since its introduction in November 1982, it has remained the popular choice of the Color Computer user.

- 60 Data Fields for each record
- 1020 spaces available per record if needed
- Maximizes multiple drive operation
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- Full Screen editing on up to 4 data entry screens
- Key click and auto key repeat
- Stores custom designed report formats
- *Obtain totals, averages*, or summaries for any field
- Output reports to printer, screen, or disk file
- Send data out to a DYNACALC compatible file
- Separate label generator for up to 10 across labels.
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* ***SIMON included free with your order***

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This graphics program does more for you than just hi-res graphic editing. It will generate lettering in hi-res graphics that can be different sizes, skinny, bold, textured, drop shadowed, raise shadowed or tall. It will also interface with the Telewriter-64 word processor for printing hi-res displays with your letters.

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See reviews in:
July '84 Rainbow, Oct. '84 Hot CoCo

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SIMON

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SIMON will "watch" you run through any BASIC program and keep track of every keystroke you make. The keystrokes can be saved in a disk file so the next time you want to perform the same procedure, SIMON will do it for you.

A custom menu can be created so that the press of one key will have SIMON run your BASIC program(s) and select the appropriate command file to use. You can even have SIMON pause at any input so that you can enter information that won't be the same each time.

SIMON is perfect for any type of reporting, file maintenance or any other program that requires a sequence of prompts to be answered each time it's used. Included free with PRO-COLOR-FILE.

Requirements: 64K Color Computer with Disk.

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PRO-COLOR-DIR will read your directories and create a master data file that can be accessed by PRO-COLOR-FILE for sorting and reporting. 1000 + records can be stored on one diskette with valuable information about each program.

• DISK ID NAME • FILENAME/EXT • TYPE OF FILE • DATE CREATED • DATE UPDATED • NUMBER OF GRANS ALLOCATED • NUMBER OF SECTORS ALLOCATED AND USED • MACHINE LANGUAGE ADDRESSES •

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A Utility program for owners of DYNACALC®

DYNAGRAPH will transfer graphic files from DYNACALC to standard graphic files for further enhancing and labeling by graphic editing programs such as MASTER DESIGN, CoCo Max or Graphicom.

DYNAGRAPH can also reduce a graph vertically and horizontally so that multiple displays can be combined into one.

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(included FREE with DYNACALC®)

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SIDE WISE makes your printer do something you never thought possible—print side ways! Print out an ASCII stored spread sheet file that has up to 255 characters per row for easier viewing. No more hassles with trying to hold sheets together!

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This is the same feature that is included in our MASTER DESIGN program. Since we felt you don't need to buy two graphics editing programs, we have made this feature available at a reduced price.

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```
420 READ Q
430 NEXT W
440 PRINT@0
450 FOR M=1TO148
460 READ F,D
470 POKE &H368B,F:POKE &H365A,D
480 A=USR0(0)
490 NEXT M
500 DATA29,162,35,162,40,96,48,9
6,29,162,35,162,40,96,48,96,22,1
62,25,162,29,96,35,96,35,96,35,5
8
510 DATA25,162,29,162,31,96,40,9
6,42,96,45,96,40,74,45,162,45,96
,48,34
520 DATA29,162,35,162,40,96,48,9
6,29,162,35,162,40,96,48,96,22,1
62,25,162,29,96,35,96,35,96,35,5
8
530 DATA25,162,29,162,31,96,40,9
6,42,96,45,96,40,96,25,96,29,0
540 DATA48,162,45,162,40,0,35,16
2,31,162,29,0,31,96,31,96,29,96,
25,58,29,162,31,162,29,96,40,0
550 DATA48,162,45,162,40,0,35,16
2,31,162,29,0,31,96,31,96,29,96,
25,96,29,96,31,96,29,0
560 DATA29,162,35,162,40,96,48,9
6,29,162,35,162,40,96,48,96,22,1
62,25,162,29,96,35,96,35,96,35,5
8
570 DATA25,162,29,162,31,96,40,9
6,42,96,45,96,40,74,45,162,45,96
,48,34
580 DATA29,162,35,162,40,96,48,9
6,29,162,35,162,40,96,48,96,22,1
62,25,162,29,96,35,96,35,96,35,5
8
590 DATA25,162,29,162,31,96,40,9
6,42,96,45,96,40,96,25,96,29,0
600 DATA48,162,45,162,40,0,35,16
2,31,162,29,0,31,96,31,96,29,96,
25,58,29,162,31,162,29,96,40,0
610 DATA48,162,45,162,40,0,35,16
2,31,162,29,0,31,96,31,96,29,96,
25,96,29,96,31,96,29,0
620 RETURN
630 '*****THE FIRST NOEL*****
640 FOR W=1TO440
650 PRINT@0,W
660 READ Q
670 NEXT W
680 PRINT@0
690 FOR M=1TO72
700 READ F,D
710 POKE&H368B,F:POKE&H365A,D
720 A=USR0(0)
730 NEXT M
740 DATA48,162,55,162,62,74,55,1
62,48,162,45,162,40,58,35,162,31
,162,29,96,31,96,35,96,40,58,35,
162,31,162
750 DATA29,96,31,96,35,96,40,96,
35,96,31,96,29,96,40,96,45,96,48
,58,48,162,55,162,62,74,55,162,4
8,162,45,162
760 DATA40,58,35,162,31,162,29,9
6,31,96,35,96,40,58,35,162,31,16
2,29,96,31,96,35,96,40,96,35,96,
31,96
770 DATA29,96,40,96,45,96,48,58,
48,162,55,162,62,74,55,162,48,16
2,45,162,40,58,29,162,31,162,35,
58,35,96
780 DATA40,34,29,96,31,96,35,96,
40,96,35,96,31,96,29,96,40,96,45
,96,48,0
790 RETURN
800 '*HARK! THE HERALD ANGELS SI
NG*
810 FOR W=1TO584
820 PRINT@0,W
830 READ Q
840 NEXT W
850 PRINT@0
860 FOR M=1TO76
870 READ F,D
880 POKE&H368B,F:POKE&H365A,D
890 A=USR0(0)
900 NEXT M
910 DATA62,96,45,96,45,74,48,162
,45,96,35,96,35,96,40,96,29,96,2
9,96,29,74,33,162
920 DATA35,96,40,96,35,58,61,96,
45,96,45,74,48,162,45,96,35,96,3
5,96,40,96,29,96,40,96,40,74,48,
162
930 DATA48,96,55,96,62,58,29,96,
29,96,29,96,45,96,33,96,35,96,35
,96,40,96,29,96,29,96,29,96,45,9
6
940 DATA33,96,35,96,35,96,40,96,
25,96,25,96,25,74,29,162,33,96,3
5,96,33,58,40,96,35,162,33,162,2
9,74,45,162,45,96,40,96,35,58
950 DATA25,96,25,96,25,74,29,162
,33,96,35,96,33,58,40,96,35,162,
33,162,29,74,45,162,45,96,40,96,
45,0
960 RETURN
970 '**O COME, ALL YE FAITHFUL**
980 FOR W=1TO736
990 PRINT@0,W
1000 READ Q
1010 NEXT W
1020 PRINT@0
```

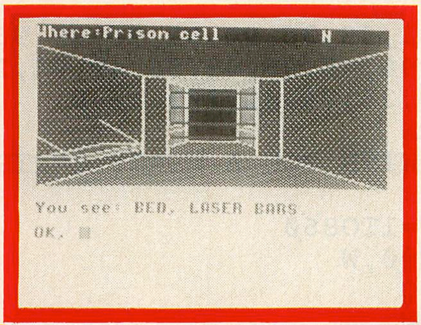
Escape: 2012

by BJ Chambless

SCENARIO: You are on an alien prison ship behind the enemy lines, captured while on a recon mission for the United Earth Forces.
OBJECT: The same for any prisoner of war—to escape and return back to your side!
SETTING: In the year 2009 the Earth solar system was attacked by hostile forces from another solar system. The battle has raged for 3 years. Even with faster-than-light star ships and planet-covering force fields, the war remains a stalemate. Both sides use their spies, scouts, and ultimate weapons to gain an edge, but, as in any war, the turning point can be the actions of a few or even one person!

In this graphics adventure there are over 35 objects to deal with, 137 rooms arranged in a 3 dimensional maze of 4 levels to traverse, and at least 2 arcade sequences to master before you can proceed. The graphics and action are superb!

Requires 64K **Cassette $24.95** **Disk $27.95**



```
Where:Prison cell          N

You see: BED, LASER BARS.
OK.
```

Treasure of the Aztecs

by John Sandberg

The year is 1520. After taking the emperor Montezuma hostage, Hernando Cortes storms Mexico City. Cortes conquers the Aztecs, but when the Spaniards search the fallen city the great Treasure of the Aztecs cannot be found!

As a greedy Spanish soldier under the Cortes, you take a small force to search the jungles in hopes of finding the missing treasure. While following a faint trail, your team is ambushed by Aztec warriors. Knocked unconscious during the battle, you awaken alone and disoriented. You must assume your men are dead and now face the relentless jungle alone; but your greed won't let you forget the Treasure of the Aztecs! Can you, a lone soldier, survive the perils of the jungle. . . and recover the great Treasure of the Aztecs?

Treasure of the Aztecs is unique, featuring special sound effect and four voice music, over 50 hires graphic screens, input with arrow keys or joystick, and allows use of the Radio Shack SSC Speech Cartridge!

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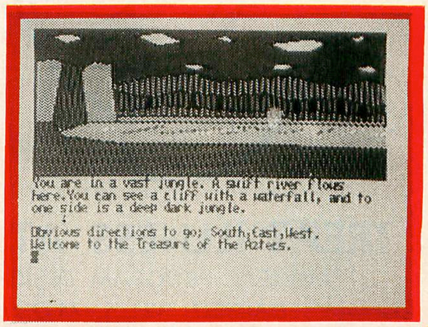

```
You are in a vast jungle. A swift river flows
here.You can see a cliff with a waterfall, and to
one side is a deep dark jungle.

Obvious directions to go; South,East,West.
Welcome to the Treasure of the Aztecs.
```

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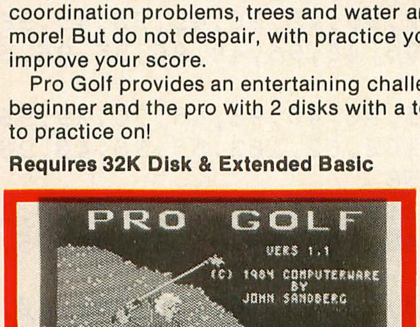
Pro Golf

by John Sandberg

Are you ready to tee off into a challenging computer simulation of America's most played sport? WARNING!!! This is NOT a game, but a simulation that will make you work for your score! It offers practice sessions with the Putting Practice and Driving Range options. Then you must tee off to play either the front nine or back nine. You will face real situations with wind factor, lies in the rough or out-of-bounds, careful club choice decisions, coordination problems, trees and water and traps, and more! But do not despair, with practice you can certainly improve your score.

Pro Golf provides an entertaining challenge to the beginner and the pro with 2 disks with a total of 36 holes to practice on!

Requires 32K Disk & Extended Basic **$29.95**



```
PRO GOLF
VERS 1.1
(C) 1984 COMPUTERWARE
BY
JOHN SANDBERG

IF GRASS IS NOT BLUE/GREEN, PRESS RESET
```

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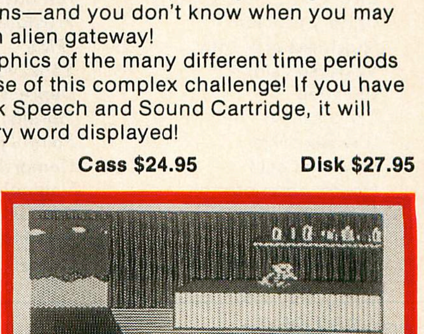
OMNIVERSE

by Scott Cabit

During your research as a theoretical physicist, you discover a way to warp space and time, allowing you to pass from one dimension to another. By using these "gateways" you can go anywhere in the multidimensional universe! But during your travels *through* time and space, you uncover an alien plot to take over the entire omniverse by controlling networks of these gateways! You must be careful, but since you are the only person on Earth who knows about the gateways, you must find a way to save Earth! It isn't easy passing through the different dimensions—and you don't know when you may pass through an alien gateway!

Enjoy the graphics of the many different time periods and the suspense of this complex challenge! If you have the Radio Shack Speech and Sound Cartridge, it will even speak every word displayed!

Requires 64K **Cass $24.95** **Disk $27.95**



```
You are in the Desert Saloon.
You see bartender Sam wiping the bar.

Obvious directions to go; North.
```

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```
1030 FOR M=1TO62
1040 READ F,D
1050 POKE&H368B,F:POKE&H365A,D
1060 A=USR0(0)
1070 NEXT M
1080 DATA40,96,40,58,55,96,40,96
,35,58,55,58,31,96,35,96,31,96,2
9,96
1090 DATA31,58,35,96,40,96,40,58
,42,96,48,96,42,96,40,96,35,96,3
1,96,42,58,48,74,55,162
1100 DATA55,0,25,58,29,96,31,96,
29,58,31,58,35,96,31,96,40,96,35
,96
1110 DATA42,74,48,162,55,96,40,9
6,40,96,42,96,40,96,35,96,40,58,
55,96,31,96,31,96,35,96,31,96,29
,96
1120 DATA31,58,35,96,31,96,29,96
,31,96,35,96,40,96,42,58,40,96,2
9,96,31,58,35,74,40,162,40,0
1130 RETURN
1140 '*WE WISH YOU A MERRY CHRIS
TMAS*
1150 FOR W=1TO860
1160 PRINT@0,W
1170 READ Q
1180 NEXT W
1190 PRINT@0
1200 FOR M=1TO82
1210 READ F,D
1220 POKE&H368B,F:POKE&H365A,D
1230 A=USR0(0)
1240 NEXT M
1250 DATA62,96,45,96,45,162,40,1
62,45,162,48,162,55,96,55,96,55,
96
1260 DATA40,96,40,162,35,162,40,
162,45,162,48,96,62,96,62,96,35,
96,35,162,33,162,35,162,40,162
1270 DATA45,96,55,96,62,162,62,1
62,55,96,40,96,48,96,45,58
1280 DATA62,96,45,96,45,96,45,96
,48,58,48,96,45,96,48,96,55,96,6
2,58,40,96
1290 DATA35,96,40,96,45,96,29,96
,62,96,62,162,62,162,55,96,40,96
,48,96,45,58
1300 DATA62,96,45,96,45,162,40,1
62,45,162,48,162,55,96,55,96,55,
96
1310 DATA40,96,40,162,35,162,40,
162,45,162,48,96,62,96,62,96,35,
96,35,162,33,162,35,162,40,162
1320 DATA45,96,55,96,62,162,62,1
62,55,96,40,96,48,96,45,0
1330 RETURN
1340 PCLEAR 3:GOTO 90
```

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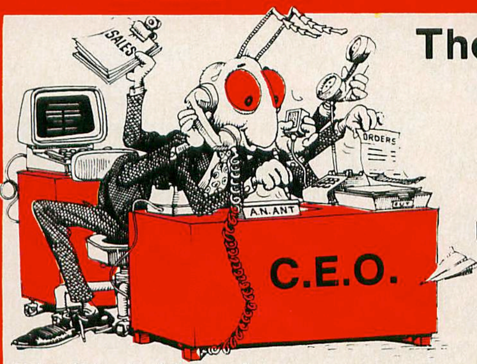

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If you need to jot a note to yourself or someone else, just pull up C.E.O.'s convenient memo pad and type away! When you're done,, save and/or print it as you see it! Use it for quick memos, business communications, or personal reminders. It's easy, quick, and organized!

REQUIREMENTS: **$49.95**
64K and at least one disk drive are required. C.E.O. supports two drive operation when available.

New Version!

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by N. Manchevsky

CoCo Cookbook is more than just a recipe index! It is a true free format data base. Designed to store and retrieve a large number of recipes, each can use up to 3040 characters with title, ingredients, and instructions. To store other data just ignore the words recipe, etc. and enter whatever you want to store and retrieve! The powerful keyword search lets you find entries with any special word (or ingredient)! A new, powerful copy feature will selectively copy recipes to a new diskette using the keyword search, helping you to organize your info easily and quickly! (This feature requires at least two drives.) Over 200 recipes are now included. These great dishes alone are worth the price!

32K Disk $32.95

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by Cris Erving

Designed to maintain, merge, and print mail list information, it includes a mail-merge feature that can insert your name and address info into letters created with your word processor. **64K Disk $32.95**

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by Mike Lustig

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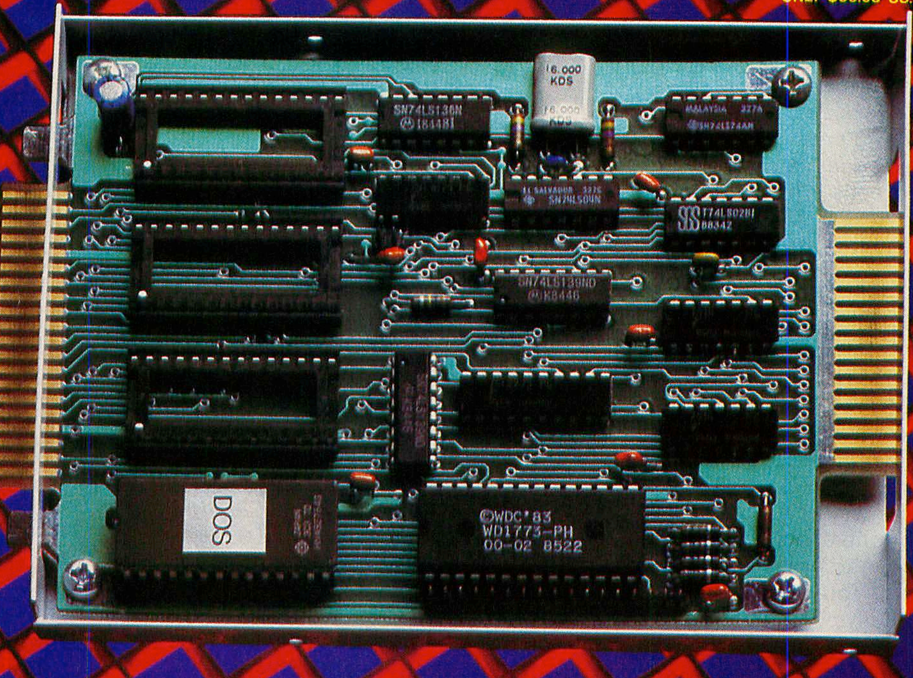

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Successful Organizational Factors For Integrating Computers In School

By Michael Plog, Ph.D.
Rainbow Contributing Editor

When we form a mental image of schools, we generally picture people and objects: students, teachers, administrators, books, chalk, desks, pencils, long hallways, or even playground equipment. The organizational factors of a school are much less visible, both in a mental image of remembered days of our own childhood and in observations of current school settings. Yet these organizational factors are extremely important to the process of educating. Books have been written and graduate courses offered in the approaches to organizational factors of educating.

Most schools are organized according to the preferences of community leaders. These preferences can vary dramatically from one community to another, and as much so within a community. The organization of a school district, including each building and classroom, determines how decisions are made, what activities are appropriate for classrooms, how spending priorities are established and a host of other characteristics that give schools their "flavor" as well as their day-to-day operational features.

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district and currently is employed at the Illinois State Board of Education.)

School districts can be organized in such a way that decisions are "top down." The superintendent and a team of administrative experts make decisions about curriculum and experiences that are followed in all classrooms in the district. Some of these districts view the school as a "factory," with learning considered a manufactured product. Teachers are viewed as a cross between quality control specialists and line supervisors. Students are expected to complete the product (learn the assigned material) in an efficient, regulated manner and time span.

Other districts have more flexibility at the classroom level, so two classes in the same grade may appear vastly different from each other. Two different fourth grade teachers may have different class content and different expectations of students. This situation is accepted, even encouraged, by district administration.

Of course, there are an infinite number of variations between these two extremes. Most schools are a blend between flexibility and rigidity. Students can generally expect the same (or similar) curriculum if they move from one school to another.

Classrooms have a variety of organizational features, as do districts. I have heard of one teacher who has a "slow row." One row of student desks is reserved for students who do not perform as well as the other students in the class. (I personally find this distasteful and insulting to students.) Some teachers organize the classroom so all students are doing exactly the same work at the same time. An opposite extreme type of organization may appear chaotic when first viewed. Desks and chairs may be placed in seemingly random order, with different students working on different assignments.

Researchers have examined the effects of school organization on all aspects of education. Findings from several sources relate school organizational features with positive student outcomes and positive teacher attitudes when using computer-based instruction. The way seats are arranged in class is determined by the type of organization in a school; the way computers are used for educational purposes is also determined by these organizational features.

There are several conditions associated with successful use of computer-assisted instruction. First, the school and classroom environment is considered. Flexible scheduling of students appears to be related with successful use of computers, as does individual student self-pacing. Computers are ideally designed for self-pacing of student learning. It is difficult to imagine successful implementation of computers in a school where all students are expected to be on the same page of the workbook at the same time.

Researchers also found that computers are more successful in schools if the use is targeted with a specific group (e.g., handicapped, gifted, slow learners). This is not to say that all students will not demonstrate positive outcomes while using the computer. Trying to introduce computers to all students at the same time is less successful than concentrating on one group for one program. When introduced into a school, computers should be focused on a specific task, with a specific group of students.

Computers are more successful if the school environment provides opportunities for integrated use of hardware and software in a classroom setting, rather than a laboratory-type setting. This is not surprising, especially given the finding that computers are more successful when students set their own pace for learning and have a flexible schedule. A laboratory situation makes flexible scheduling difficult.

Students seem to produce more positive results when computers are available in their classrooms. One possible explanation for this finding is that students working with a computer in a classroom also have access to the teacher directing the lesson. In a laboratory setting, the teacher may not be knowledgeable about every computer lesson subject.

More positive student outcomes and teacher attitudes are related to the active support of computer use by the principal. Also, the computer tends to be more successful when principals view its role as instructional rather than administrative. In some settings, the role of the principal is primarily administrative — the job is to enforce and fulfill district policy and attend to administrative tasks. In other organizational settings, the principal is the instructional leader of the school. The job in this case involves student contact and close interaction with teachers.

Factors other than classroom and school environment have been found to be related to successful use of computers in schools. The decision-making process is also important. More successful use is related to a more decentralized and flexible decision-making process, especially during implementation of educational computer uses, key teachers are crucial. If those key teachers have a role in the decisions made about implementation, then greater success is realized. Some of the decisions to be made by the teachers include courseware and, to a lesser extent, hardware. This is only reasonable. Teachers work harder to make students accept and achieve if they help select the courseware they will be teaching.

Finally, an important organizational feature of successful computer implementation is training. Teacher training in the use of the courseware packages before actual use in the classroom is very beneficial. Lessons are easily handled if the teacher is prepared. When both teachers and students are learning a particular courseware at the same time, confusion can be expected. This reduces the computer's benefit for students and teachers.

Another aspect of training is for the staff to provide the training. The most successful training is provided by people who are or have been in similar teaching situations. This finding does not decrease the importance of training by sales agents. There are times when a software package is unfamiliar to the staff, therefore training by sales agents, as well as the package developers, cannot be slighted.

Successful computer implementation is also related to follow-up support for the instructional staff. Initial training may be important, but follow-up service helps ensure adequate use of the courseware. This might be especially important for a rather large package with several units of instruction included. The greater the number of components for a package, the greater the need for follow-up service.

Teachers who have had training in individualized instruction tend to produce better results than teachers without it. Since the computer works better in an individualized setting, training and familiarity with this technique is important for teachers.

If software producers take these findings to heart, we can expect some changes in courseware in the near future. It is logical to assume that future development will include comprehensive plans for implementation as part of the courseware. Also, we should expect more customization of software for local district curricula.

These findings only relate to computer-assisted instruction (CAI). We would expect similar findings if examining programs for computer-managed instruction (CMI). Unfortunately, those studies are not available at this time. We would also expect similar findings for packages related to other uses of computers in schools than just CAI or CMI.

While many factors are important in successful use of computers in schools, we should not overlook the organizational features of the school system. Any comments, thoughts or suggestions about these ideas are always welcome. If you want to share your thoughts, please write. My address is 829 Evergreen, Chatham, IL 62629. ☐

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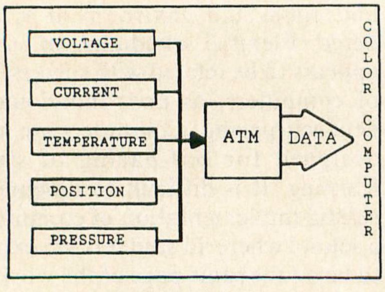

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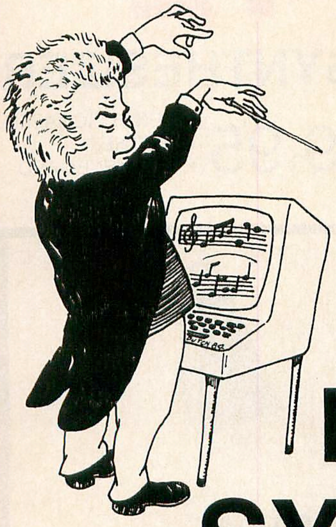

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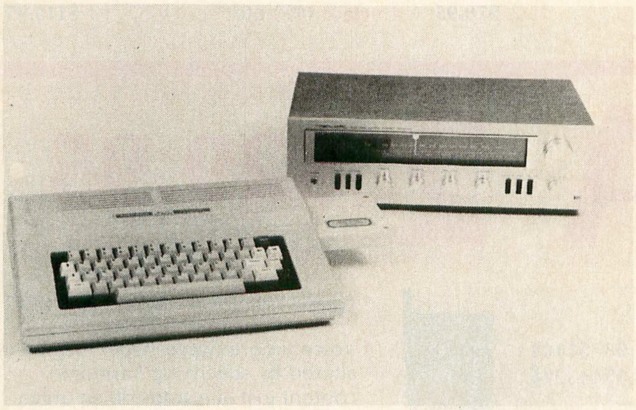

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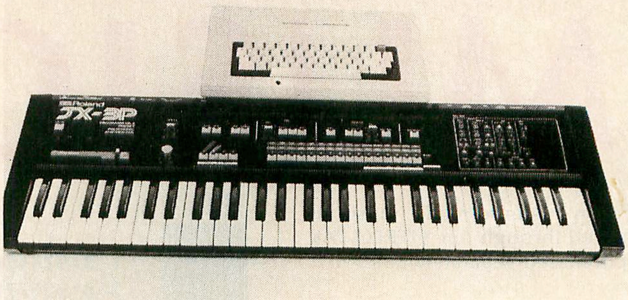

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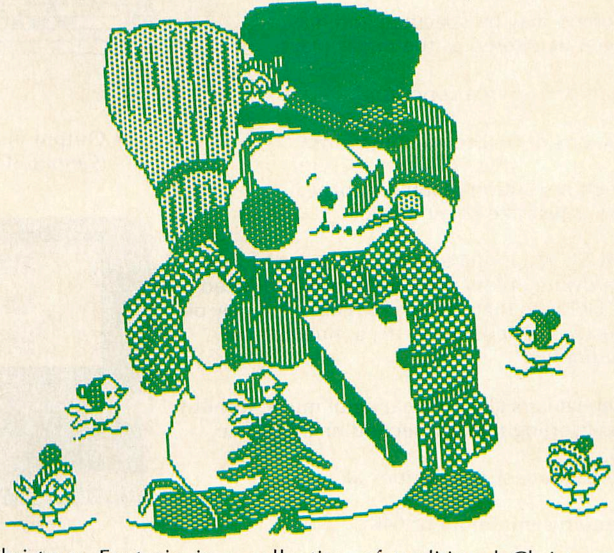

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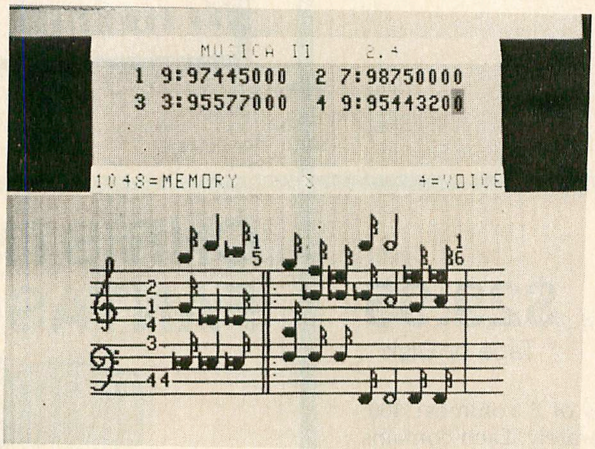

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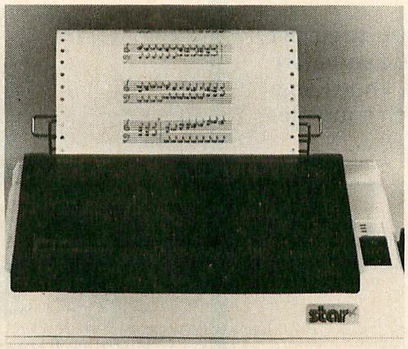

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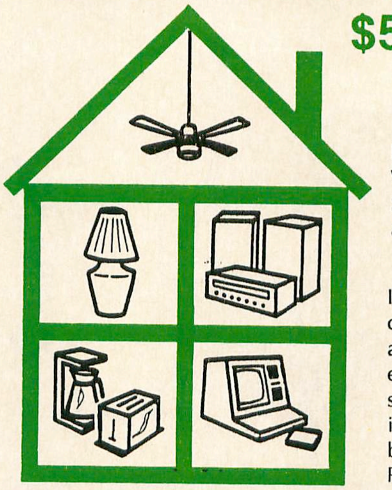

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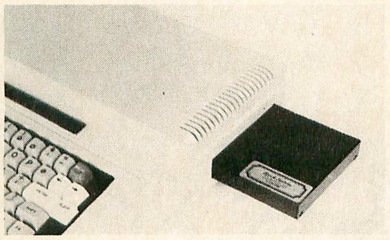

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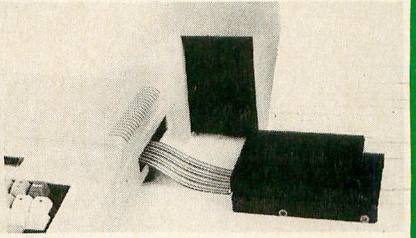

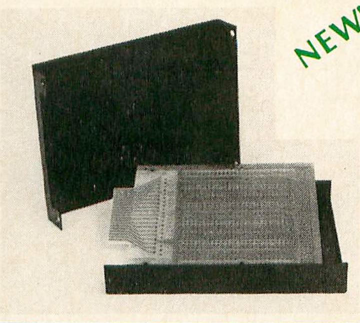

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Prototype Board only **$19.95**
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Need an SC-01? **$29.00**

Disks .... (any quantity)	$1.49
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Hard Tape Box	$0.29
6821	$2.95
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7407	$0.79
IC sockets 14, 16, 22 pin	$0.29
IC sockets 24, 28, 40	$0.39

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BLANK DISK
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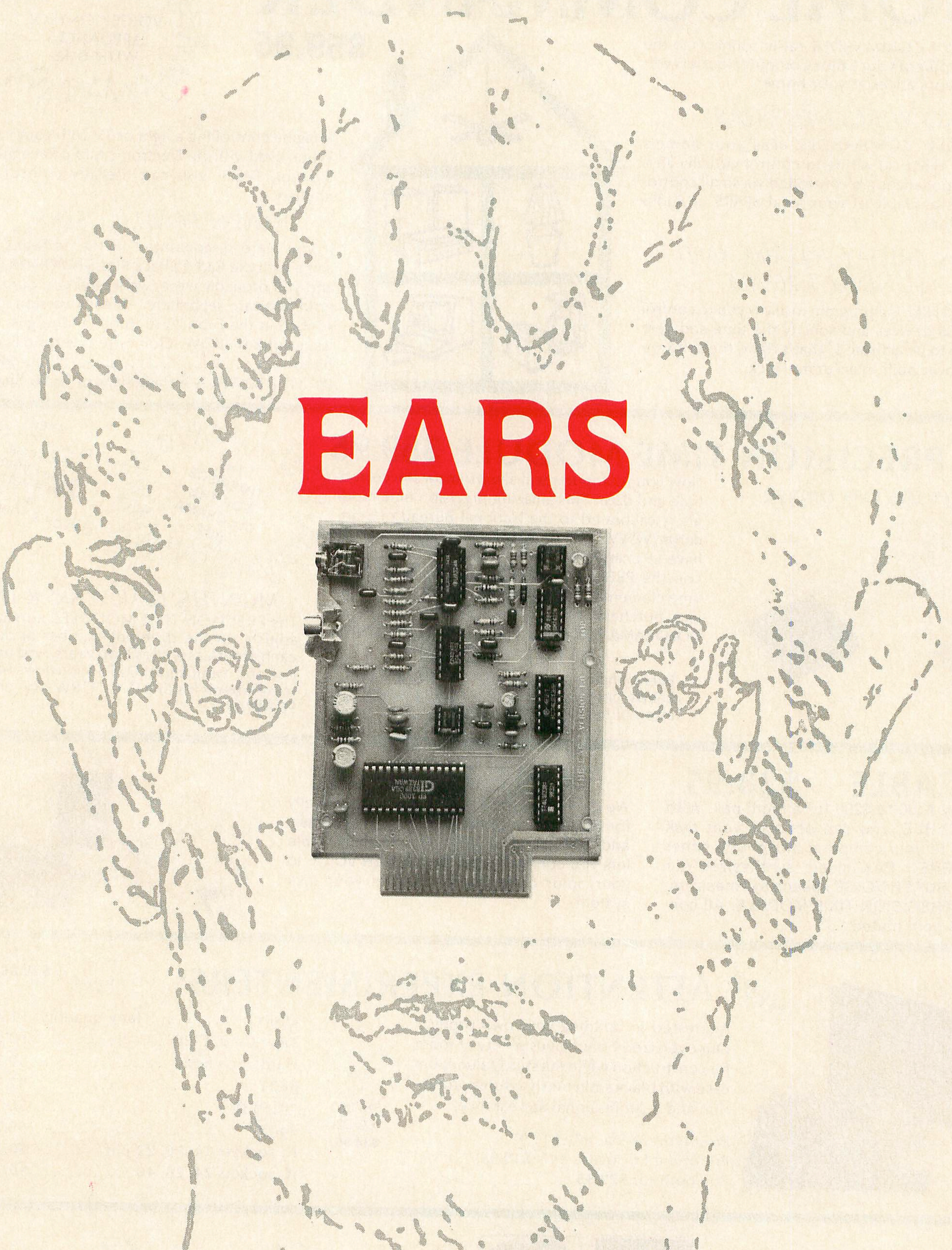
EARS



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Now Your Computer Can Listen To You!

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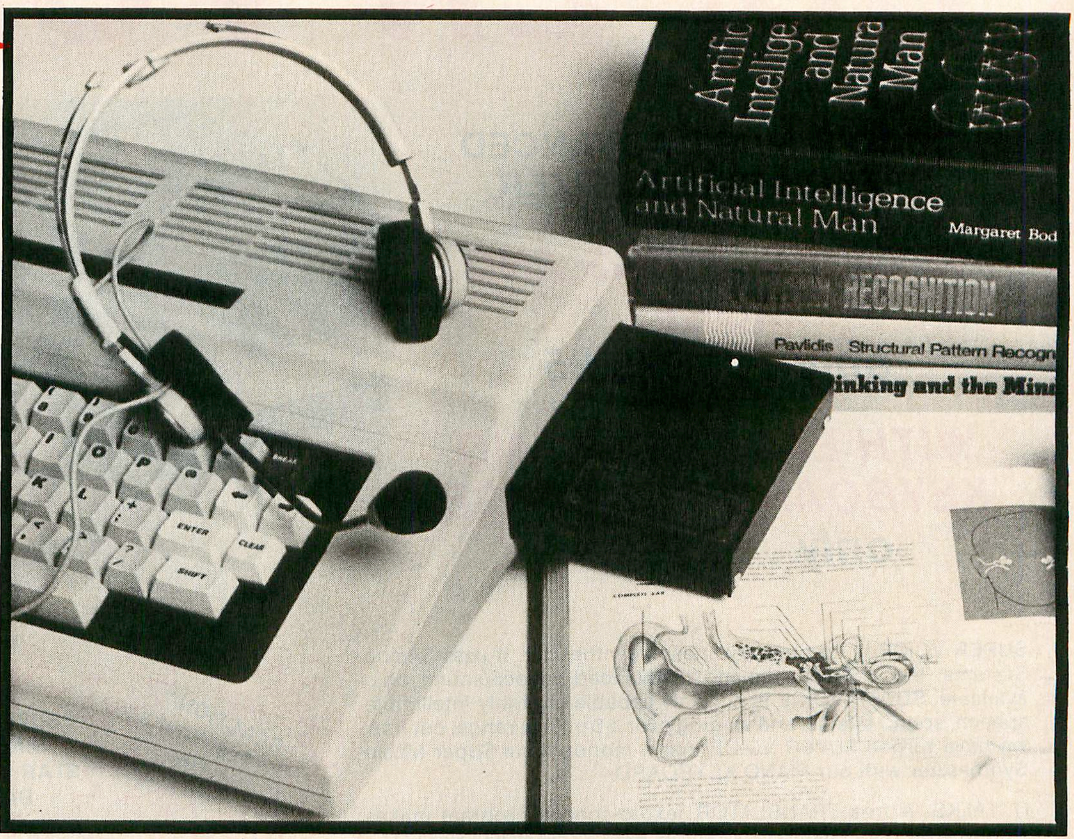
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Artificial Intelligence and Natural Man
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Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

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Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

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SUPER VOICE $20 OFF

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COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

IT TALKS, SINGS AND MORE.

only . . . $79.95

WITH EARS OR PIANO KEYBOARD PURCHASE

only . . . $59.95

SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

IT TALKS. A free TRANSLATOR text-to-speech program makes writing your own talking program as easy as SAYING "HELLO."

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Y-Cable or Multi-Pak.

FREE "REACTION" To Test Your Reflexes

FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

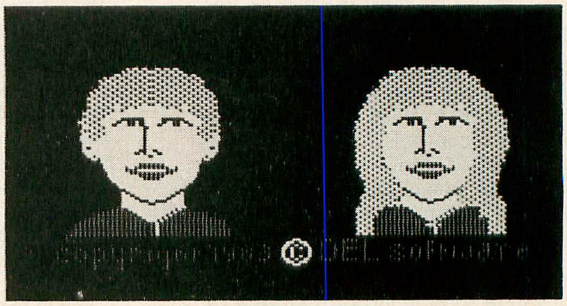
Here are the facts; the decision is yours.

	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

FOOL'S CROSSING

The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story.

32K Disk $24.95



SUPER TALKING HEADS

When the SUPER VOICE speaks in a low pitched voice, the man speaks, when a high pitched voice is used the woman speaks. $24.95

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'TALKING SOFTWARE'

FOR THE VOICE, SUPER VOICE ™, RS SPEECH & SOUND PAK

RADIO SHACK® SPEECH & SOUND TRANSLATOR

FREE When you buy any 5 of our Talking Programs

We believe that no COCO speech synthesizer gives you the power and flexibility of the SUPER VOICE. Nevertheless, some have decided to go with the Radio Shack SPEECH & SOUND PAK. For those we've decided to open our TALKING LIBRARY by offering the SPEECH & SOUND TRANSLATOR. Just load this program and our entire library is open to you.

But that's not all, this program adds features. You get increased intelligibility, the power of an exception table to specify specific pronunciations, $12.81 is spoken in dollars and cents, 1,234,567 is spoken in millions, thousands, and hundreds, and much more. **$24.95**

TERMTALK All the features of an intelligent telecommunications program plus what appears on the TV is spoken.

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- It talks

Please specify version (VOICE or RS SPEECH & SOUND PAK)
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TALKING BINGO BINGO was never like this. The VOICE or SUPER VOICE makes all the calls while you sit back and play. Comes with 20 playing cards and 200 markers. High Resolution graphic screen, 3 timing level, ball count and pause control. **$24.95**

ESTHER the talking psychoanalyst. An excellent example of artificial intelligence. She may not solve all your problems, but her insight will amaze you. Just like the original Eliza. **$24.95**

SCORE E-Z A yahtzee type game. Up to six can play. **$24.95**

ADVENTURES

CULT OF THE CAVE BEAR You're a stranded time traveler 50,000 years in the past. Can you fix your time machine while still surviving in this alien environ, and make it back? **$29.95**

SHIP HUNT Play Battleship with your CoCo. All status reports are spoken. Ready battery, aim, fire at will! **$24.95**

FINAL COUNTDOWN You must stop the mad general from launching a missile at Moscow and causing WW III. Has multiple voices for added realism. **$24.95**

STAR TALK You're the Star Fleet Captain. Your mission...destroy the enemies' Dragon Star Ships. All status reports are spoken! **$24.95**

FOOL'S CROSSING The world's *first* TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story. **$24.95**

ADVENTURE GENERATOR Create talking adventure games that are 100% Machine Language. Up to 99 rooms, 255 objects, 70 command words and 255 conditional flags.
64K Disk **$39.95**

SUPER VOICE SONGBOOKS

These two songbooks were specifically designed for the SUPER VOICE, the only speech synthesizer flexible enough to allow singing.

VOLUME I (POTPOURRI) A collection of miscellaneous tunes for everyone. Songs include: How Much Is That Doggie in the Window, Daisy, Aloha Oe, Old McDonald and more. **$19.95**

VOLUME 2 (NURSERY RHYMES) Includes: Twinkle Twinkle Little Star, Mary Had A Little Lamb, 3 Blind Mice, the Alphabet Song and more. May be used with SUPER TALKING HEADS so they (Paul & Pauline) sing the songs. **$19.95**

EDUCATION

ANIMATED SENTENCES The child builds complete sentences from a graphic menu using keyboard or joystick. The action is then spoken and acted out graphically. It's a great way to learn the parts of speech (i.e. verb, subject, noun, etc.). **$24.95**

KING AUTHOR'S TALES A creative writing tool to allow a child to write compositions, or short stories. Q & A option is also included. **$29.95**

COLOR MATH Addition, Subtraction, Multiplication, and Division are mastered. Student may specify difficulty level. **$24.95**

SPELL-A-TRON Student builds a dictionary of words to be quizzed on. Perfect for Spelling B. **$24.95**

SPELLING TESTER A graphic spelling game. The student is shown objects to be spelled. **$9.95**

POETRY CREATOR The VOICE speech unit is used to speak poetry that is created. **$9.95**

SHORT STORY MAKER A program to create and speak stories created by the child. **$9.95**

Season's Greetings From Speech Systems

FOREIGN LANGUAGE Learn a foreign language. French dictionary is included. **$9.95**

PRESIDENTS The student is able to master the Presidents of the U.S. **$9.95**

STATES A program designed to aid the student in learning correct spelling of the states. **$9.95**

CAPITALS Learning the State's Capitals is made more interesting using speech. **$9.95**

HANGMAN A word guessing game. You must guess the word before you hang. **$9.95**

MATH DRILL A program to help teach arithmetic. **$9.95**

All software, except as noted, shipped on tape but may be moved to disk.

SCHOOL IS IN THE HEART OF A CHILD

Designating this final column as a 'graduation ceremony'

It's Been A Great Two Years

By Bob Albrecht and Ramon Zamora
Rainbow Contributing Editors

"School Is In The Heart Of A Child" is for parents of quite young children. We want to help you work and play with your 3- to 8-year-old child and learn to use computers as a joyful family experience. We suggest ways to use the home computer as another means to encourage your child's independence, growth and control over her own life. See the pride on her face as she directs the computer to do what she selects with deliberation. See her head gears switch to "on" as she progresses step by step with your presence and caring guidance. We will explore (we hope, with your help) the following:

- Specific "teaching" techniques so the discovery can be the child's own.
- Critical evaluation of software based on extensive playtesting in family and related environments.
- Additional resources to consult: books, magazines, software publishers, networks, etc.
- Suggestions for interludes and fun times away from the computer (a must!): call the librarian for information; watch TV together and discuss it; work together as volunteers in a community project; take an "awareness" walk.
- Whatever we learn from families we work with in Menlo Park or from you, our readers. Let's pool our knowledge and share our experiences as we learn from our children.

Copyright© 1985 by DragonQuest, P.O. Box 7627, Menlo Park, CA 94026-7627. Portions of "School Is In The Heart Of A Child" are extracted from *TRS-80 Color BASIC* by Bob Albrecht.

(Well-known author Bob Albrecht has written numerous articles and books on personal computers through his association with DragonQuest. Ramon Zamora is author and co-author of several books, co-founder of Computer Town USA!, and is currently designing computer games for kids at Child Ware Corp. in Menlo Park, Calif.)

The first episode of "School is in the Heart of a Child" in February 1984 began like this:

Hello, and Welcome

A long time ago, in a galaxy nearby, the home was the center of learning. Parents and children worked together to pass on knowledge to daughter and son. What was not learned at home was commonly learned by becoming an apprentice who learned from a master. There were few "schools" — institutions devoted to teaching instead of learning.

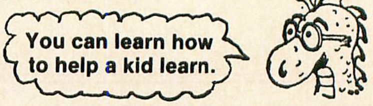
Time passed and schools flourished. In the U.S.A. today schools are becoming increasingly less adaptive to a changing world. Fortunately, something is happening, something that provides rich and highly motivating environments for learning outside of schools. Millions of people are buying computers for home and personal use. Within a few years nearly everyone will have a computer. There exists an unprecedented opportunity for learners to take control of the means of learning.

As learning moves out of the school into the direct control of learners, once again people are enjoying learning as an adventure — for themselves, their families, their friends and neighbors. Through the use of a home computer, the entire family can work and play together to learn anything from the mundane to the most esoteric subjects, and on a schedule and pace chosen by the learners.

This is the last "School is in the Heart of a Child." Thanks to everyone at THE RAINBOW for giving us space and wonderful readers so we could experiment and develop these ideas. Our almost two years of writing for the best CoCo magazine has been a great experience. This ending is another beginning. We'll tell you about that at the end of this final installment.

DragonTown Library

Here are some additional sources of information that we find helpful, useful, entertaining, mind-stretching or inspirational.


You can learn how to help a kid learn.

A Book of Puzzlements: Play and Invention with Language by Herbert Kohl. If our house was burning down, we would save this book. It is a never-ending source of ideas. Open it anywhere and enjoy a wonderment of words. From: Shocken Books, 200 Madison Avenue, New York, NY 10016, $14.95.

Edmund Scientific — Worlds of "If" indeed! The Edmund catalog is full of it! Imagine a school with everything in the *Edmund Scientific* catalog and a bunch of kids. Stand back and let them try everything. Stand close and learn with them. From: Edmund Scientific, 101 E. Gloucester Pike, Barrington, NJ 08007.

Computer Currents — We love good information. We find it all in *Computer Currents*. And, it's free! *Computer*

Currents is a bi-weekly tabloid that knows all and tells all in the San Francisco Bay area. You can pick it up at more than 1,300 places. To find the closest place, call and ask: (415) 848-6860. If you live elsewhere, you can subscribe: $22 for six months (13 issues). From: Computer Currents, 2550 Ninth Street, Berkeley, CA 94710.

Grolier Encyclopedia on CD-ROM — Here it is, the beginning of the next revolution in home learning. Grolier's *Encyclopedia Americana* is now available on laser video disc and also on compact disc, read-only memory (CD-ROM). *KnowledgeDisc*, the laser video disc product, is compatible with any standard laser disc player. Users can scan or "browse" the disc, frame by frame, or use an index to get to specific entries — all this without a computer! The *KnowledgeDisc* containing the entire 21-volume *Encyclopedia Americana* costs $89.95.

The CD-ROM ($199) version hooks up to a computer and offers sophisticated search capabilities. The educational and entertainment possibilities far exceed any home computer capability from the BCDR (Before CD-ROM) era. We predict that encyclopedia adventuring, or just plain browsing, will become the next great indoor sport!

By the time you read this, low-cost CD-ROM drives will be available for the ATARI ST and IBM compatible computers. Let's hope Tandy will make a drive for the CoCo. For information, contact Grolier Electronic Publishing, Inc., Sherman Turnpike, Danbury, CT 06816.

Mail-File Games

At our house, we have a family mail file. Each family member has a hanging file folder with his or her name on the tab. There are also file folders for several friends. We use the mail file for "mailing" information to each other.

We also use the mail file in another way — for in-home Play-By-Mail (PBM) games. Popular games are *Guess My Number, Guess My Letter, Guess My Word* and an assortment of two-dimensional games where the player must find an invisible something in a grid, a map, a tree, a network or whatever space someone dreams up.

One person is the GameMaster (GM); the other is the player. The GM prepares a game sheet and puts it in the player's file. When the player finds the game sheet, she or he makes a move and puts the game sheet in the GM's file. The GM records an appropriate hint and returns the game sheet to the player's file. This process continues until the player has won the game, solved the puzzle, found the invisible object, discovered the secret message or otherwise completed the game task. These games are played in a leisurely fashion, typically one move a day for each game.

Now here's the boggler: Many of our mail file games are available as expensive computer games! We are amazed by the prices charged for some educational software. For home use, many "educational" programs we have seen are overpriced. So, instead of using the $29.95 or $39.95 computer versions of our mail file games, we simply write simple progams in BASIC. We find the combination of playing by mail in the mail file plus playing a simple version of the same on the computer is much better than using high-priced software.

DragonSmoke

We will continue with *DragonSmoke*, our own periodical about personal and family learning. In *DragonSmoke*, we share our ideas about the following things.

- Computers for beginners: Anyone can learn how to read and understand computer programs. Think of it as a recreation — it can be fun! *DragonSmoke* will help make it fun.
- Role playing games: Millions of people, mostly kids, play role playing games: *Dungeons & Dragons, Champions, RuneQuest, Star Trek* and dozens more. Powerful ways to learn! We will develop games encouraging nonviolence, cooperation, exploration, story-telling and problem-solving. *DragonSmoke* will explore the bright side of "The Force."
- Play-by-Mail (PBM) games: A great way to use basic skills! We encourage you to explore this emerging world of computer-moderated, multi-player games that you can play by mail once or twice a month. Yes, you will also find games that can be played at home using your own mail file.

DragonSmoke is intended to be shared. You may copy anything in it for yourself or to give to others. Make and give away as many copies as you wish. For a sample copy, send $1 to *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.

Farewell, RAINBOW. Thrive and remember: Reality expands to fill the available fantasies.

One-Liner Contest Winner . . .

This program draws circles and fills them in a way that really shows off the CoCo's graphics capabilities!

The listing:

```
0 CLS:PMODE3,1:SCREEN1,0:PCLS:FO
RT=10TO96 STEPRND(10)+3:X1=RND(0
):X2=RND(X)+X:CIRCLE(126,96),T,2
,1,X1,X2:NEXTT:CIRCLE(126,96),T,
2:PAINT(126,96),3,2:GOTO0
```

Ari Kaplan
Lawrenceville, NJ

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

One-Liner Contest Winner . . .

This one-liner shows the extremely fine color resolution possible when different colors are on adjacent lines.

The listing:

```
10 O=160:PMODE4:SCREEN1,1:POKE17
9,160:PCLS:POKE65314,11:FORY=1TO
192:SOUNDO,1:POKE178,O:LINE(0,Y)
-(255,Y),PSET:READO:IFO=0THENRES
TORE:READO:NEXTELSENEXT:FORX=0TO
1STEP-0:NEXT:DATA160,3,224,35,35
,83,99,51,243,80,0:'(C)1985 RAY
LARABIE
```

Raymond Larabie
Whitelake, Ontario

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

SLEEP TIGHT

Your CoCo Is Awake Tonight

*In this first of a two-part series,
you'll learn how to use CoCo to keep an eye
on the home front while you're away*

By Dennis H. Weide

"Sleep Tight - Your Air Force Is Awake Tonight." Many may remember the picture of a wrinkled 99-year-old man in full flight gear. It hangs in almost every U.S. Air Force office around the world. While it isn't much of a confidence builder, it's always worth a good laugh.

This month, I'll show you how to sleep tight when away from home, because your CoCo will be awake. This is a program and hardware project that allows you to scan your house or apartment from a remote location.

What are the advantages of this? The next time you go out of town, a housesitter can call your house at scheduled intervals to check security. If there's a terminal available, you can call and check yourself. The housesitter can leave messages to inform you of any major problems (i.e., the washing machine hose just broke and your house is flooded).

I always call my house and scan the alarms and messages at least once a day. It's a good feeling knowing the house is secure. Before you complain about long distance costs, they're really fairly inexpensive. Using an AT&T credit card and a Model 100, I can call from a motel room and not have to pay the motel charge for placing the call; an hour's worth of calls costs only $10 per month — a small price to pay for knowing your home is secure. I stay on the line less than 10 minutes per call.

There is one thing that must be understood before we go any further: The program will only scan alarms upon command. If someone tries to break in, the alarm will be tripped and stay tripped until reset, but the computer will not recognize the alarm until it has been commanded to scan the circuit.

A Look at the Software

First let's take a look at the program required to scan the alarms. Listing 1 is the alarm program. It's menu driven and requires a password to sign onto the system. You can change the password (up to 200 alphanumeric characters) by changing PASSWORD in Line 7900. If the correct password isn't given, the system won't allow access to any other program section.

Once signed on, the program asks for the date, time and terminal width. Date and time are for disk reference only. The system doesn't have a real-time clock. The width of the terminal you're calling from determines screen formatting. Default is 32 characters wide. The menu is displayed at the beginning of the program and anytime the ENTER key is pressed.

The terminal program used is a modified version of Dan Downard's terminal program from the November 1983 RAINBOW. The modifications include changing the memory location and disabling the BREAK key. This prevents anyone from having access to the disk by interrupting the program. It is hand

---

(Dennis Weide is an avid computer hobbyist who teaches programming on the CoCo and IBM PC. He has written for all the major CoCo magazines, including many programs in RAINBOW. Dennis lives in Albuquerque, N.M.)

BEWARE
of the
COMPUTER!

assembled (without an editor/assembler), so there is no assembly language listing. To make it simple, it's in BASIC so it can be loaded and run from one program.

Reading and writing messages is easy. It uses `DSKI$` to read the directory so wrong filenames won't stop program execution. Duplicate message names are not allowed since the second message would erase the first. To keep messages short, use abbreviations whenever possible. The maximum message length is 200 characters. The time you signed on is added to the message before being written to disk. When messages are read, the date and time are displayed at the beginning of each message. Erase messages via DOS using the `KILL` command.

Scanning Alarms

To activate the alarm system (turn it on), turn on the power supply switch and computer and load the program. When you run the program, sign on answering all prompts and request RESET ALARM to initialize the alarm circuits.

To scan the alarm circuit, request an ALARM STATUS from the main program menu. If the alarm system is turned off, an ALARM DEACTIVATED message appears and the program stops scanning. If the alarm system is on and no alarms exist, an ALARM ACTIVATED message is printed on the screen. If an alarm switch is open, scanning the alarm circuit will detect the alarm.

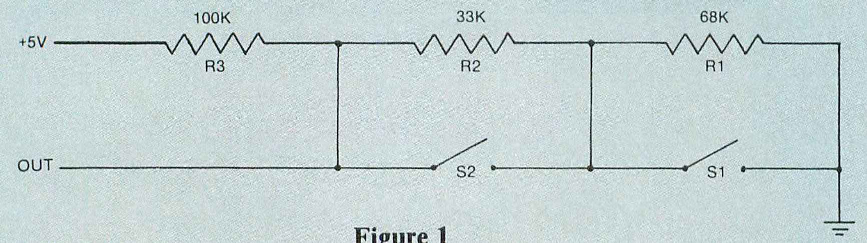


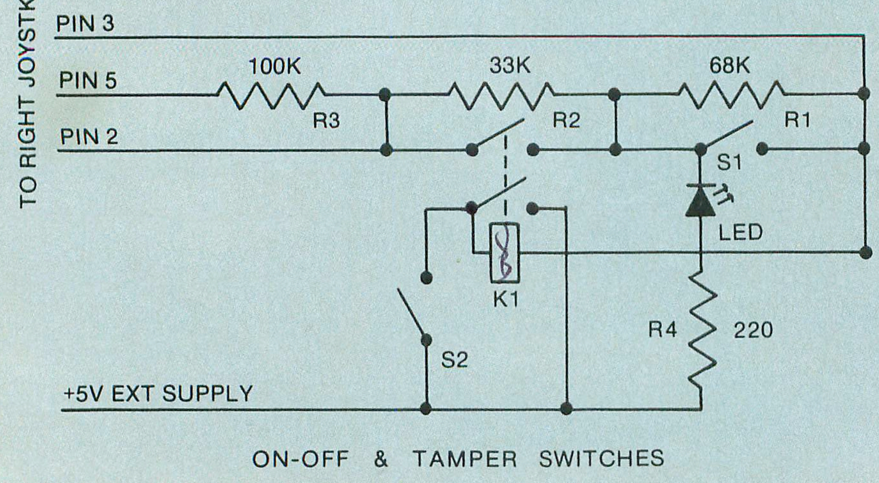
Figure 1

Table 1

Typical Joystick Values for Figure 1

Joystick	Configuration	Reading	Range
0 & 1	All switches open	31	> 28
0 & 1	S1 closed only	24	20-28
0 & 1	S2 closed only	12	9-15
0 & 1	S1 & S2 closed	0	0
2 & 3	All switches open	30	> 28
2 & 3	S1 closed only	23	20-28
2 & 3	S2 closed only	12	9-15
2 & 3	S1 & S2 closed	0	0

Schematic 1



The circuit is divided into four sectors: north, south, east and west. A message is printed whenever an alarm condition exists showing which side of the house it's on. To check if the alarm is clear, use the RESET ALARM command. If clear, an ALARM CLEAR message is printed when scanned. If not, the alarm is printed again.

There is a tamper switch located in the electrical box with the on/off key switch. Any attempt to defeat the alarm system at this box closes the tamper switch. The next time the circuits are scanned, a TAMPER ALARM message is printed on the screen. The only way to reset this alarm is to turn off the external power supply.

All responses to commands are written to disk along with the time you signed on the system. The alarm log can be reviewed by entering the command ALARM LOG. This will list all system activity. If the log gets too full, erase it with the CLEAR LOG command. The next time you read the log, the only entry will be LOG CLEARED and the date and time you signed on.

The last command is SIGN OFF. This, of course, signs you off the system and stops program execution until ENTER is sent from the remote end or from the CoCo keyboard. The next time you sign on, press ENTER. The program jumps to the SIGN ON routine and you can begin again. Any command not acceptable will result in an INVALID COMMAND message.

A Look at the Hardware

The hardware for this program is easy to build. All input to the computer is via the joystick ports with the exception of the alarm reset circuit, which uses the cassette motor relay to reset the alarm circuit. Layout of the components is not critical and they can be soldered or wire wrapped on perf board.

A Simple Circuit

The basic circuit for the alarm system is a simple voltage divider acting as a variable resistor. Look at Figure 1 to see how it works. Three resistors are connected between +5 volts of the joystick port and ground. Closing either switch, S1 or S2, shorts the associated resistor and changes the voltage fed to the output. This output is fed to `JOYSTK(0)`. Closing both switches puts the output at ground potential. Since

p. 122, 126

the joystick port is the input to an analog-to-digital converter, voltage changes result in a corresponding change in the digital output of the converter. The digital output is then used to determine the alarm circuit status.

The entire alarm hardware works on this principle. Resistor R3 is used to ensure that the joystick port always sees at least 100K ohms of resistance. Anything less than that causes the other three joystick ports to vary erratically. Table 1 gives the values of the four joystick ports for all circuit configurations. Your readings will probably vary somewhat, but if they're within the range listed, you won't have to modify the program. Now let's look at the individual circuits to see what they do.

On/Off and Tamper Switches

Schematic 1 shows the on/off circuit and the tamper switch. You can see that the basic circuit of Figure 1 is used in this portion of the alarm circuit. Resistors R1 through R3, switch S1 and relay K1 make up the circuit. In addition, resistor R4 and a light emitting diode (LED) are used along with an external +5 volt supply to provide an alarm on/off indicator. All components are located on the alarm board except the on/off switch (S1), the tamper switch (S2) and the LED. These are located in the electrical box at the front door.

Closing the on/off switch (S1) turns on the alarm system by shorting R1. This lowers the voltage fed into the joystick port and the corresponding digital reading. This also places ground on the cathode of the LED, causing it to light. The LED is the on/off indicator at the front door.

The tamper switch (S2) is a push button switch that rests against the front plate of the electrical box at the front door. Any attempt to defeat the alarm system causes this switch to close momentarily operating relay K1. This relay shorts resistor R2, indicating to the computer that a tamper alarm exists. The relay has a self-holding path that keeps it operated until the power is removed. The tamper alarm can't be defeated from outside the house.

Remote Alarm Loops

The remote alarm loops are shown in Schematic 2. They are also similar to Figure 1 except they use two relays along with the switches. Again, these relays are used to hold the alarm activated until reset by program command. This prevents someone from opening a

Schematic 2

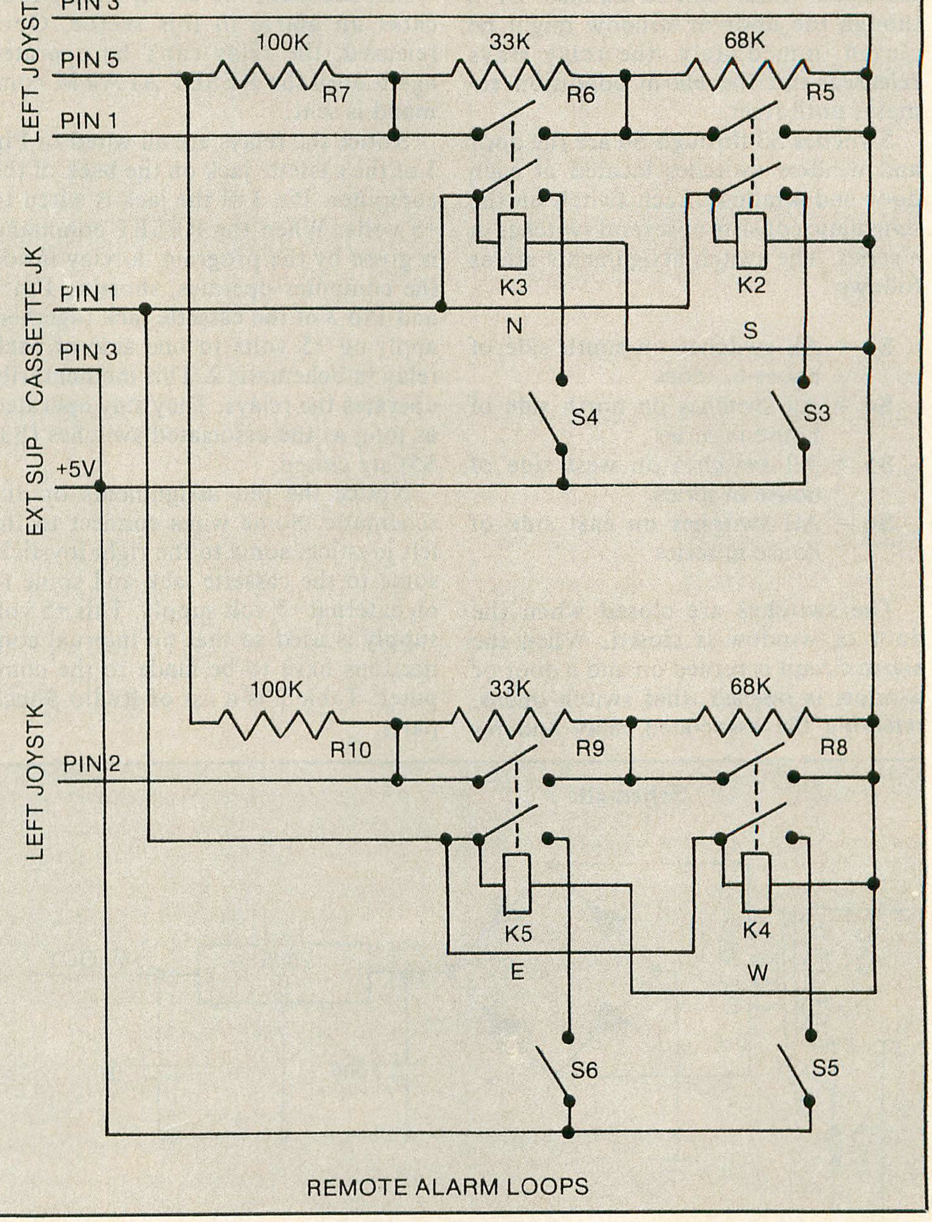


Table 2

Alarm Circuit Parts List

Item	Price	Radio Shack Part #
N/C window switches	$3.49 ea.	49-495
N/O tamper switch	1.39 ea.	49-528
Door lock switch	9.95 ea.	49-511
N/C 120 ft. foil	5.99 roll	49-502
N/C foil connectors	2.59 pkg/6	49-504
Joystick plugs (2 ea.)	1.19 ea.	274-020
Cassette plug (1 ea.)	1.49 ea.	274-003
5VDC DPDT mini-relay (5 ea.)	3.99 ea.	275-215
33K Ohm resistors (3 ea.)	.39 pkg/5	271-1341
68K Ohm resistors (3 ea.)	.39 pkg/5	271-1345
100K Ohm resistors (3 ea.)	.39 pkg/5	271-1347
220 Ohm resistor (1 ea.)	.39 pkg/5	271-1313
TLR-107 Hi-brite LED	.89 pkg/2	276-033
Hook-up and alarm wire	N/A	N/A

door or window and closing it before the alarm circuit can be scanned. Even though the door or window might be closed immediately, the relay stays released and the alarm condition remains until reset.

Switches S3 through S6 are the door and window switches located at each door and window. Each switch on the schematic consists of several switches in a series. The switch assignments are as follows:

S3 = All switches on south side of house in series
S4 = All switches on north side of house in series
S5 = All switches on west side of house in series
S6 = All switches on east side of house in series

The switches are closed when the door or window is closed. When the alarm circuit is turned on and a door or window is opened, that switch opens, releasing the associated relay and removing the short across its resistor. When scanned, the alarm circuit indicates an alarm in this sector. Once released, the relay can't be operated again until the RESET ALARM command is sent.

Notice the relays are all wired to Pin 1 of the cassette jack on the back of the computer. Pin 3 of the jack is wired to +5 volts. When the RESET command is given by the program, a relay inside the computer operates, shorting Pin 1 and Pin 3 of the cassette jack together, applying +5 volts to one side of each relay in Schematic 2. This momentarily operates the relays. They stay operated as long as the associated switches (S3-S5) are closed.

Notice the pin assignments on the schematic. Some wires connect to the left joystick, some to the right joystick, some to the cassette jack and some to an external +5 volt supply. This +5 volt supply is used so that no internal connections have to be made to the computer. Table 2 is a list of Radio Shack parts.

Schematic 3

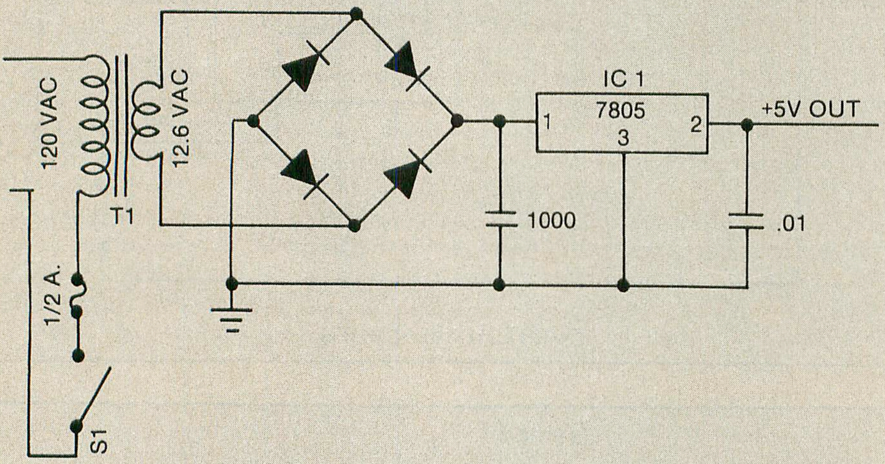


Table 3

Power Supply Parts List

Item	Price	Radio Shack Part #
12.6V Mini-transformer	$3.59 ea.	273-1365
1000 Mfd. elect. capacitor	1.59 ea.	272-1019
.01 Mfd. epoxy capacitor	.59 pkg/2	272-1065
Full wave bridge rectifier	.89 ea.	276-1161
7805 Fixed IC regulator	1.59 ea.	276-1770
Submini SPST toggle switch	1.59 ea.	275-612
Fuse holder	.99 ea.	270-367
Fuses	.69 pkg/3	270-1271
Project box for power Supply and alarm board	3.99 ea.	270-252

The External Power Supply

Schematic 3 shows the external power supply. It uses a 7805 regulator chip (IC 1) to provide a regulated +5VDC. Switch S1 is the on/off switch for the power supply and a ½ amp fuse is used in the transformer primarily for overload protection. The rectifier is an IC bridge.

Capacitor C1 is an electrolytic capacitor used to provide better regulation. Capacitor C2 is a bypass capacitor and is not absolutely required. Ground on the power supply must be connected to ground on either joystick port (Pin 3) to provide a common system ground. Table 3 gives a list of Radio Shack parts for the power supply.

Connecting to the Computer

Before connecting the alarm circuit to the computer, breadboard all the components and test your wiring, then verify that the voltages fed to the joystick port never drop below zero (negative) or rise above +4.8 volts for all possible circuit configurations. The analog-to-digital converter inside the computer can't handle voltages outside this range. Voltages outside this range indicate an error in the circuit wiring.

While the alarm circuit doesn't have an audible alarm, you can modify it to activate an alarm bell outside the house. The secret to a good alarm system is one nobody else can figure out. You can modify this circuit to provide all sorts of configurations and options.

For those who wish to save money, shop around for parts. You can save quite a bit if you mail-order parts or buy them from Radio Shack when they are on sale.

Next Month: Something for Those without Modems

Next month, I'll show you how to use this information to provide a local alarm system that uses a hardware clock and has continuous alarm scanning.

If you have any questions or comments, you can address them to me at 14201 Marquette N.E., Albuquerque, NM 87123. If you wish an answer, please enclose a self-addressed, stamped envelope. I'll mail an answer back within 24 hours. Please include as much information about the problem as possible — I can't help much, for instance, if you only say you get an error when the program is run. Let me know what kind of error and what line it is in. Also, explain what you were doing when the error occurred. ☐

2900	27	13900	234
3800	14	16400	24
5900	139	18600	95
7900	79	21500	24
9800	251	END	88
12100	42		

The listing: RMTALARM

```
1000 '      REMOTE BURGLAR ALARM
1100 '      BY DENNIS H. WEIDE
1200 '      14201 MARQUETTE N.E.
1300 '      ALBUQUERQUE, NM  8712
3
1400 '      (C) 1985
1500 '
1600 '
1700 CLEAR2000,&H7000
1800 FOR X=&H7CC7 TO &H7D7F
1900 READ A:POKE X,A
2000 NEXT X
2100 EXEC&H7CC7
2200 IF PEEK(&H7D80)=134 AND PEE
K(&H7D81)=184 THEN PK=1
2300 FOR X=&H7D80 TO &H7E09
2400 READ A
2500 IF PK=0 THEN POKE X,A
2600 NEXT X
2700 DATA 189,169,40,142,4,32,16
,142,124,223,166,160,167,128,16,
140,125,127,35,246,57,125,128,0,
96,96,96,82,69,77,79,84,69,96,67
2800 DATA 79,67,79,96,66,85,82,7
1,76,65,82,96,65,76,65,82,77,96,
96,96,96,96,96,96,96,96,104,67,1
05,96,113,121,120,117,96,66,89,9
6
2900 DATA 68,110,72,110,87,69,73
,68,69,96,96,96,96,96,96,96,96,9
6,96,96,96,113,116,114,112,113,9
6,77,65,82,81,85,69,84,84,69,96
3000 DATA 78,110,69,110,96,96,96
,96,96,96,96,96,96,96,96,96,96,9
6,65,76,66,85,81,85,69,82,81,85,
69,96,96,78,77,96,96,96,96,96,96
3100 DATA 96,96,96,96,96,96,96,9
6,96,96,96,96,96,96,96,96,120,11
9,113,114,115,96,96,96,96,96,96,
96,96,96,96,96,96,96,96,96
3200 DATA 134,184,151,230,190,1,
104,175,141,0,53,190,1,107,175,1
41,0,105,134,126,183,1,106,183,1
,103,48,141,0,11,191,1,104,48,14
1
3300 DATA 0,29,191,1,107,57,52,2
,13,111,38,14,129,13,38,7,134,10
,189,142,12,134,13,189,142,12,53
,2,126,125,168,15,112,13,111,38
3400 DATA 50,50,98,52,21,173,159
,160,0,39,2,32,36,246,255,34,86,
37,242,141,35,198,1,52,4,79,141,
26,246,255,34,86,36,2,170,96,104
3500 DATA 96,36,242,50,97,132,12
7,129,3,38,1,79,53,149,126,125,1
68,141,0,52,2,150,230,33,254,74,
38,251,53,130
3600 IF PK=0 THEN EXEC &H7D80
3700 FOR X=4 TO 9
3800 READ AM$(X)
3900 NEXT X
4000 DATA NORTH SIDE ALARM,SOUTH
 SIDE ALARM,NORTH/SOUTH ALARM
4100 DATA EAST SIDE ALARM,WEST S
IDE ALARM,EAST/WEST ALARM
4200 DIM DR$(68)
4300 GOTO 7100
4400 '
4500 '      START OF ALARM SCAN
4600 '
4700 FOR X=0 TO 3
4800 A(X)=JOYSTK(X)
4900 NEXT X:Y=4
5000 '
5100 '      COMPUTE ALARM VALUE
5200 '
5300 PRINT STRING$(TW,"*");
5400 IF A(1)>39 THEN AR$="ALARM
```

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```
DEACTIVATED":GOSUB 20200:GOTO 65
00
5500 IF A(1)>9 AND A(1)<15 THEN
AR$="ALARM ACTIVATED":GOSUB 2020
0
5600 IF A(1)=0 THEN AR$="TAMPER
ALARM":GOSUB 20200
5700 IF A(1)>9 AND A(1)<15 THEN
AR$="TAMPER CLEAR":GOSUB 20200
5800 FOR X=2 TO 3
5900 IF A(X)=0 THEN AF(Y)=0:AF(Y
+1)=0:AF(Y+2)=0:FF=FF+1
6000 IF A(X)>9 AND A(X)<15 THEN
AR$=AM$(Y):GOSUB 20200:AF(Y)=1:F
1=1
6100 IF A(X)>20 AND A(X)<28 THEN
 AR$=AM$(Y+1):GOSUB 20200:AF(Y+1
)=1:F1=1
6200 IF A(X)=>28 THEN AR$=AM$(Y+
2):GOSUB 20200:AF(Y+2)=1:F1=1
6300 Y=Y+3:NEXT X
6400 IF F1=1 AND FF=2 THEN AR$="
ALARM CLEARED":F2=0::GOSUB 20200
:F1=0
6500 FF=0
6600 PRINT STRING$(TW,"*")
6700 RETURN
6800 '
```

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```
6900 '     PASSWORD AND COMMANDS
7000 '
7100 CLS
7200 INPUT"ENTER PASSWORD";PW$
7300 TW=32
7400 PRINT:INPUT"ENTER DATE (MM/
DD/YY)";DT$
7500 PRINT:INPUT"ENTER TIME (HH/
MM)";CL$
7600 PRINT
7700 CL$=LEFT$(CL$,2)+":"+RIGHT$
(CL$,2)
7800 CL$=DT$+"  "+CL$
7900 IF PW$="PASSWORD" THEN AR$=
"SIGN ON":PRINT STRING$(TW,"#");
:GOSUB 20200 ELSE PRINT:GOTO 720
0
8000 PRINT STRING$(TW,"#")
8100 PRINT:INPUT"ENTER TERMINAL
WIDTH";TW:IF TW<20 THEN TW=32
8200 '
8300 '     COMMAND MODULE
8400 '
8500 CLS:PRINT:PRINT
8600 TW$="PROGRAM MENU"
8700 PRINTTAB((TW-LEN(TW$))/2) T
W$
8800 TW$="------------
8900 PRINTTAB((TW-LEN(TW$))/2) T
W$
9000 PRINT
9100 TW$="1. WRITE MESSAGE"
9200 PRINTTAB((TW-LEN(TW$))/2) T
W$
9300 TW$="2. READ MESSAGE "
9400 PRINTTAB((TW-LEN(TW$))/2) T
W$
9500 TW$="3. ALARM STATUS"
9600 PRINTTAB((TW-LEN(TW$))/2) T
W$
9700 TW$="4. ALARM LOG   "
9800 PRINTTAB((TW-LEN(TW$))/2) T
W$
9900 TW$="5. RESET ALARM "
10000 PRINTTAB((TW-LEN(TW$))/2)
TW$
10100 TW$="6. CLEAR LOG    "
10200 PRINTTAB((TW-LEN(TW$))/2)
TW$
10300 TW$="7. SIGN OFF     "
10400 PRINTTAB((TW-LEN(TW$))/2)
TW$
10500 PRINT
10600 LINEINPUT"GO >";CM$
10700 PRINT
10800 CM=VAL(CM$)
10900 IF CM>0 AND CM<9 THEN 118
0
11000 IF CM$="" THEN 8600
```

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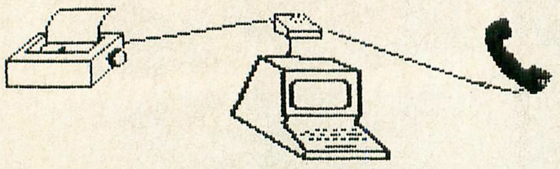
```
 11100 TW$="INVALID COMMAND"
 11200 PRINTTAB((TW-LEN(TW$))/2)
 TW$
 11300 GOTO 10500
 11400 '
 11500 '      START PROGRAM HERE
 11600 '      USE "ON CM GOSUB"
 11700 '
 11800 ON CM GOSUB 14600,17300,47
 00,21200,23800,24800,22700
 11900 IF F5=1 THEN F5=0:GOTO 720
 0
 12000 IF AR$="SIGN OFF" THEN PRI
 NT:GOTO 7200
 12100 GOTO 10600
 12200 '
 12300 '      READ DIRECTORY
 12400 '
 12500 '
 12600 Z=1
 12700 TW$="CURRENT MESSAGES"
 12800 PRINTTAB((TW-LEN(TW$))/2)
 TW$
 12900 TW$="----------------
 13000 PRINTTAB((TW-LEN(TW$))/2)
 TW$
 13100 FOR Y=3 TO 11
 13200 DSKI$ 0,17,Y,A$,B$
 13300 FOR X=1 TO 128 STEP 32
 13400 IF MID$(A$,X,1)=>"A" AND M
 ID$(A$,X,1)=<"Z" AND MID$(A$,X+8
 ,3)="MSG" THEN DR$(Z)=MID$(A$,X,
 8):PRINTTAB((TW-LEN(DR$(Z)))/2)
  DR$(Z):Z=Z+1
 13500 IF MID$(B$,X,1)=>"A" AND M
 ID$(B$,X,1)=<"Z" AND MID$(B$,X+8
 ,3)="MSG" THEN DR$(Z)=MID$(B$,X,
 8):PRINTTAB((TW-LEN(DR$(Z)))/2)
  DR$(Z):Z=Z+1
 13600 NEXT X
 13700 NEXT Y
 13800 RETURN
 13900 '
 14000 '      READ AND WRITE MSGS
 14100 '
 14200 '
 14300 '
 14400 '      WRITE MESSAGE
 14500 '
 14600 NA$="":A$="":PRINT:PRINT
 14700 PRINT"SPLIT MESSAGE PROPER
 LY ON SCREENUSE NO MORE THAN 200
  CHARACTERS"
 14800 PRINT:PRINT
 14900 INPUT"ENTER MESSAGE NAME";
 NA$:PRINT:IF NA$="" THEN RETURN
 15000 NA$=NA$+"        ":NA$=LEF
 T$(NA$,8)
```



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Program Quickie . . .

4K Fit

Editor:

I have discovered a way to shorten the *USA Flag* program by J.E. Borger (July 1985, Page 113) to fit in a 4K ECB Color Computer. The following is my version of the program:

```
20 LINE(1,1)-(255,156),PSET,B
30 LINE(1,1)-(100,84),PSET,B
40 FOR Y=10 TO 74 STEP 16
50 FOR X=10 TO 90 STEP 16
60 CIRCLE(X,Y),5
70 NEXT X,Y
80 FOR Y=18 TO 66 STEP 16
90 FOR X=18 TO 90 STEP 16
100 CIRCLE(X,Y),5
110 NEXT X,Y
120 FOR Y=12 TO 84 STEP 24
130 LINE(100,Y)-(255,Y+12),PSET,BF
140 NEXT Y
150 FOR Y=84 TO 144 STEP 24
160 LINE(1,Y)-(255,Y+12),PSET,BF
170 NEXT Y
180 PAINT(5,5),3,4
190 FOR Y=5 TO 150 STEP 24
200 PAINT(250,Y),2,4
210 NEXT
220 LINE(1,1)-(255,191),PSET,B
```

Lines 1430 through END remain the same.

Chris Gesek
Woronoco, MA

```
15100 GOSUB 12600
15200 FOR X=1 TO 68
15300 IF NA$=DR$(X) THEN 15600
15400 NEXT X
15500 GOTO 16000
15600 PRINT:PRINT
15700 TW$="MESSAGE NAME ALREADY
IN USE"
15800 PRINTTAB((TW-LEN(TW$))/2)
TW$
15900 GOTO 14900
16000 NA$=NA$+".MSG"
16100 PRINT:PRINT"ENTER MESSAGE"
:PRINT
16200 INPUT A$
16300 IF LEN(A$)>190 THEN PRINT:
PRINT"warning 10 CHARACTERS REMA
INING"
16400 A$=CL$+"  "+A$
16500 OPEN"O",#1,NA$
16600 WRITE#1,A$
16700 CLOSE#1
16800 PRINT
16900 RETURN
17000 '
17100 '      READ MESSAGE
17200 '
17300 GOSUB 12600:PRINT
17400 INPUT"ENTER FILE TO READ "
;NA$
17500 NA$=NA$+"        "
17600 NA$=LEFT$(NA$,8)
17700 FOR X=1 TO 68
17800 IF NA$=DR$(X) THEN 18300
17900 NEXT X
18000 PRINTTAB((TW-LEN(TW$))/2)
TW$
18100 TW$="NO MESSAGE BY THAT NA
ME"
18200 RETURN
18300 PRINT:PRINT:NA$=NA$+".MSG"
18400 OPEN"I",#1,NA$
18500 INPUT#1,A$
18600 PRINT A$:PRINT
18700 CLOSE#1
18800 RETURN
18900 '
19000 '      READ AND WRITE ALARM
S TO DISK
19100 '
19200 '
19300 '
19400 '      OPEN BUF #1
19500 '
19600 OPEN"D",#1,"ALARM.DAT",33
19700 FIELD#1,18 AS AL$,15 AS TI
$
19800 RETURN
19900 '
20000 '       WRITE ALARMS TO DISK
20100 '
20200 PRINTTAB((TW-LEN(AR$))/2)
AR$
20300 GOSUB 19600
20400 LSET AL$=AR$
20500 LSET TI$=CL$
20600 PUT#1,LOF(1)+1
20700 CLOSE#1
20800 RETURN
20900 '
21000 '       READ ALARMS FROM DIS
K
21100 '
21200 GOSUB 19600
21300 PRINT
21400 FOR X=1 TO LOF(1)
21500 GET#1,X
21600 TW$="*****LOG ENTRY*****"
21700 PRINTTAB((TW-LEN(TW$))/2)
TW$
21800 PRINTTAB((TW-LEN(TI$))/2)
TI$
21900 PRINTTAB((TW-LEN(AL$))/2)
AL$:PRINT
22000 NEXT X
22100 CLOSE#1
22200 RETURN
22300 '
22400 '       SIGN OFF
22500 '
22600 '
22700 AR$="SIGN OFF"
22800 PRINT STRING$(TW,"#");
22900 GOSUB 20200
23000 PRINT STRING$(TW,"#")
23100 FOR X=1 TO 30
23200 PRINT STRING$(TW,"*");
23300 NEXT X
23400 INPUT X$:RETURN
23500 '
23600 '       RESET ALARM
23700 '
23800 MOTOR ON
23900 AR$="RESET ALARM"
24000 PRINT STRING$(TW,"#");
24100 GOSUB 20200
24200 PRINT STRING$(TW,"#")
24300 MOTOR OFF
24400 RETURN
24500 '
24600 '       ERASE ALARM LOG
24700 '
24800 KILL"ALARM.DAT"
24900 PRINT STRING$(TW,"#");
25000 AR$="LOG CLEARED"
25100 GOSUB 20200
25200 PRINT STRING$(TW,"#")
25300 RETURN
```

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WARP FACTOR X was written by an engineer for the Kennedy Space Center and has been three years in the making. You will appreciate the attention to detail and complex inner workings of the program. The program is supported by eight pages of documentation important to the success of your mission. Your progress through the eighteen sectors of the galaxy will be recorded and saved for your next adventure into space. **WARP FACTOR X** includes versions for 32K, 64K, and COCO 2. It requires one disk drive and comes packaged in a vinyl library case. **$34.95**

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DR. WHO is a graphics program based on Britains' number one longest running television series, "Doctor Who". As the game begins you are in control of the Tardis, a time machine disguised as a police call box, and you must find and recover the seven keys to time. To accomplish this feat you will travel around the Galifry Solar System from planet to planet. You must find each planet, fight you way through aliens, and land on each planet. The difficulty level increases with each planet. **DR. WHO** is a real time game. No matter what you are doing energy is being consumed and planets are moving in orbit. All controls and commands are entered through the keyboard. Move your Tardis through the galaxy as you search for far away planets and battle aliens in you quest for the seven keys of time. Your ultimate reward, however, lies out beyond the stars. Requires 32K. **Tape — $24.95; Disk — $29.95**

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Trivia Tic-Tac-Toe

'X' (or 'O') marks the spot with this multiple-choice quiz

By Rick Pitel

One of the problems with quiz or trivia games on the computer is that the answer must be exact. A misspelled word or failure to state the answer exactly the same way the computer sees it gets counted wrong. On the other hand, the multiple-choice type question lends itself very well to computer logic. This is the idea behind *Tic-Tac-Toe.*

The format is that of a tic-tac-toe game with nine categories from which to choose. It uses low resolution graphics and can be run from disk or tape. The program is generally self-explanatory and can be played from the keyboard or with joysticks. If done from the keyboard, first enter the number of the square to be chosen and then one through four to choose the answer. With joysticks, 'X' uses the right joystick and 'O' uses the left joystick. Choose the square by positioning the joystick according to the flashing indicator and push the button. Choose the answer in the same way.

If the answer is correct, an 'X' or 'O' will appear in the square. If the answer is wrong, the correct answer is shown and another category is placed in that square. The game works by pulling a data file holding 100 questions into an array, then feeding multiple-choice questions to the squares as needed.

(Rick Pitel is a design engineer with Freightliner Corporation and has been programming in BASIC *on the Color Computer for about two and a half years. He lives in Brush Prairie, Wash.)*

In order to create the data file it was necessary to write a utility program (Listing 2). The utility program is menu driven and allows for creating and saving the data file on disk or tape. If using disk, the data file is named to distinguish it from any others you may create. The utility program walks you through the creation of the data file asking for "category," "question," "correct answer" and three "bogus answers." It then scrambles the answers into random order.

Because of the screen format, the category is limited to seven letters, the question is limited to one line and the four answers are limited to two lines. The program will let you know if the entry is too long. I have included a data file that consists of 100 trivia questions.

(Any questions you may have about *Tic-Tac-Toe* can be directed to Mr. Pitel at 10416 NE 156th Street, Brush Prairie, WA 98606, phone 206-254-4638. Please include an SASE when writing.) ☐

250	115
540	68
760	137
990	233
1160	112
1400	245
END	136

Listing 1: TICTACTO

```
100 REM   ** TRIVIA TAC TOE **
110 REM * RICK PITEL 1984 *
120 CLEAR 12000
130 DIM Q$(100,3):DIM AN(100):DI
M SQ(9)
140 CLS:PRINT:PRINT
141 INPUT"DATA FILE ON 1-CASSETT
E OR       2-DISK";A
150 INPUT"NAME OF DATA FILE";F$
151 IF A=2 THEN160
152 INPUT"TURN ON TAPE RECORDER
AND HIT   <ENTER>";A$
153 OPEN"I",-1,F$
154 FOR I=1 TO 100
155 INPUT#-1,Q$(I,1),Q$(I,2),Q$(
I,3),AN(I)
156 NEXTI
157 CLOSE-1:GOTO200
160 OPEN"I",1,F$
170 FOR I=1 TO 100
180 INPUT #1, Q$(I,1),Q$(I,2),Q$
(I,3),AN(I)
190 NEXT I
200 FOR I=1 TO 9
210 SQ(I)=I:NEXT
220 CLOSE 1
230 K=0
240 CLS3:INPUT"CONTROL WITH <1>K
EYBOARD   OR    <2>JOYSTICKS";CC
250 IF CC>2 THEN 240
260 C$=CHR$(207)
270 BUF$=C$+C$+C$+C$+C$+C$+C$
280 ' INITIAL DRAW #
290 CLS5
300 FOR L=96 TO 127
310 PRINT@L,CHR$(204);
320 PRINT@L+128,CHR$(204);
330 NEXT L
340 FOR L=10 TO 362 STEP32
350 PRINT@L,CHR$(128);
360 PRINT@L+10,CHR$(128);
370 NEXT L
380 FOR S=1 TO 9
390 K=K+1
400 GOSUB 470
410 PRINT@BP,S;
420 PRINT@BP+31,Q$(K,1);
430 NEXT S
440 P=1:NF=0
450 GOTO 580
460 ' SUBROUTINE S TO BP
470 ON S GOTO 480,490,500,510,52
0,530,540,550,560
480 BP=3:RETURN
490 BP=13:RETURN
```

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```
500 BP=23:RETURN
510 BP=131:RETURN
520 BP=141:RETURN
530 BP=151:RETURN
540 BP=259:RETURN
550 BP=269:RETURN
560 BP=279:RETURN
570 ' PLAY
580 PRINT@384
590 IF P=1 THENPRINT@384,"X TURN
";ELSE PRINT@384,"O TURN";
600 IF CC=2 THEN 1260
610 I$=INKEY$:IF I$=""THEN 610
620 S=VAL(I$):IF S=0 THEN 610
630 PRINT@480," ***********  "S"
  *********  ";
640 IF S>9 THEN 590
650 IF ABS(SQ(S))>100 THEN 590
660 GOSUB 470
670 PRINT@BP+64,CHR$(191)+CHR$(1
91)+CHR$(191)+CHR$(191)+CHR$(191
);
680 PRINT@384,Q$(SQ(S),2)
690 PRINT@416,Q$(SQ(S),3)
700 IF CC=2 THEN 1450 'JOYSTICK
CONTROL
710 I$=INKEY$:IF I$=""THEN 710
720 A=VAL(I$):IF A=0 THEN 710
730 PRINT@480,A;
740 PRINT@BP+31,BUF$;:PRINT@BP+6
3,BUF$;
750 IF A=AN(SQ(S)) THEN 850 'RIG
HT
760 PRINT@485,"WRONG-IT WAS"AN(S
Q(S));
770 SOUND 1,6:K=K+1
780 IF K>100 THEN 1180
790 IF Q$(K,1)="X" THEN 1180
800 PRINT@BP,S;
810 PRINT@BP+31,Q$(K,1);
820 SQ(S)=K
830 IF P=1 THEN P=2 ELSE P=1
840 GOTO 580
850 PRINT@485,"CORRECT          ";
860 SOUND 180,6:NF=NF+1
870 A$=CHR$(195):B$=CHR$(204):C$
=CHR$(207)
880 IF P=2 THEN SQ(S)=-300:GOTO9
40
890 SQ(S)=300:PRINT@384,"X WINS
THE SQUARE";
900 PRINT@BP,A$+B$+C$+B$+A$;
910 PRINT@BP+32,C$+C$+CHR$(128)+
C$+C$;
920 PRINT@BP+64,B$+A$+C$+A$+B$;
930 GOTO 990
940 PRINT@BP,C$+B$+CHR$(128)+B$+
C$;
950 PRINT@BP+32,CHR$(128)+C$+C$+
C$+CHR$(128);
960 PRINT@BP+64,C$+A$+CHR$(128)+
A$+C$;
970 PRINT@384,"O WINS THE SQUARE
980 ' CHECK FOR WINNER
990 A=SQ(1)+SQ(2)+SQ(3):IF ABS(A
)=900 THEN 1110
1000 A=SQ(4)+SQ(5)+SQ(6):IF ABS(
A)=900 THEN 1110
1010 A=SQ(7)+SQ(8)+SQ(9):IF ABS(
A)=900 THEN 1110
1020 A=SQ(1)+SQ(4)+SQ(7):IF ABS(
A)=900 THEN 1110
1030 A=SQ(2)+SQ(5)+SQ(8):IF ABS(
A)=900 THEN 1110
1040 A=SQ(3)+SQ(6)+SQ(9):IF ABS(
A)=900 THEN 1110
1050 A=SQ(1)+SQ(5)+SQ(9):IF ABS(
A)=900 THEN 1110
1060 A=SQ(3)+SQ(5)+SQ(7):IF ABS(
A)=900 THEN 1110
1070 IF NF=9 THENPRINT@384,"GAME
 OVER":GOTO 1130
1080 IF P=1 THEN P=2 ELSE P=1
1090 GOTO 580
1100 ' WINNER
1110 IF A=900 THEN A$="X"ELSE A$
="O"
```

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```
1120 PRINT@384,A$" WINS THE GAME
!"
1130 PRINT
1140 IF K>90 THENPRINT"INSUFFICI
ENT QUESTIONS LEFT FOR ANOTHER G
AME":STOP
1150 INPUT"ANOTHER GAME <Y OR N>
";A$
1160 IF LEFT$(A$,1)="Y" THEN 121
0 ' REPEAT GAME
1170 STOP
1180 PRINT@384,"YOU ARE OUT OF Q
UESTIONS"
1190 STOP
1200 ' REPEAT GAME
1210 FOR I=1 TO 9
1220 SQ(I)=K+I
1230 NEXT I
1240 GOTO 290
1250 REM  JOYSTICK CONTROL
1260 B$=CHR$(175)+CHR$(175)+CHR$
(175):C$=CHR$(207)+CHR$(207)+CHR
$(207)
1270 IF P=2 THEN 1360
1280 X=JOYSTK(0):Y=JOYSTK(1)
1290 S=INT(X/22)+1+INT(Y/22)*3
1300 IF ABS(SQ(S))>100 THEN 1280
1310 GOSUB470
1320 PRINT@BP+65,B$;
1330 B=PEEK(65280)
1340 IF B=126 OR B=124 OR B=254
OR B=252 THEN 670
1350 PRINT@BP+65,C$;:GOTO 1280
1360 A=JOYSTK(0)
1370 X=JOYSTK(2):Y=JOYSTK(3)
1380 S=INT(X/22)+1+INT(Y/22)*3
1390 IF ABS(SQ(S))>100 THEN 1360
1400 GOSUB470
1410 PRINT@BP+65,B$;
1420 B=PEEK(65280)
1430 IF B=125 OR B=124 OR B=253
OR B=252 THEN 670
1440 PRINT@BP+65,C$;:GOTO 1360
1450 B=PEEK(65280):IF B=127 OR B
=255 THEN 1460 ELSE 1450
1460 IF P=2 THEN 1520
1470 A=INT(JOYSTK(0)/16)+1
1480 PRINT@BP+65,A;
1490 B=PEEK(65280)
1500 IF B=126 OR B=124 OR B=254
OR B=252 THEN 730
1510 GOTO1470
1520 X=JOYSTK(0):A=INT(JOYSTK(2)
/16)+1
1530 PRINT@BP+65,A;
1540 B=PEEK(65280)
1550 IF B=125 OR B=124 OR B=253
OR B=252 THEN 730
1560 GOTO1520
```

180	165
406	229
530	105
700	75
850	126
1110	147
1250	4
1540	193
END	15

Listing 2: TRIVUTIL

```
10 REM **UTILITY PROGRAM**
15 CLEAR 12000
20 DIM Q$(100,3):DIM AN(100):DIM
 R$(4)
50 A$="XXXXXXX"
60 B$="XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXX"
100 CLS
110 PRINT"THIS IS THE PROGRAM TH
AT CREATES & MODIFIES THE QUESTI
ON/ANSWER
120 PRINT"FILES FOR THE TRIVIA-T
AC-TOE    GAME"
125 PRINT"PICK ONE OF THE FOLLOW
ING"
130 PRINT"1-CREATE A NEW QUESTIO
N/ANSWER  FILE"
135 PRINT"2-MODIFY OR CORRECT AN
 EXISTING QUESTION/ANSWER FILE"
140 PRINT"3-ADD TO A FILE THAT I
S NOT FULL YET<LESS THAN 100 QUE
STIONS>"
150 PRINT"4-LOADING AND UNLOADIN
G TO DISK OR TAPE<MOVING THE DAT
A FILE>"
170 FOR I=1 TO 100
180 Q$(I,1)=A$:Q$(I,2)=B$:Q$(I,3
)=B$+B$:AN(I)=0
190 NEXT I
200 INPUT MC
210 IF MC=1 THEN 500
220 IF MC<4 THEN 290
230 CLS
260 PRINT"1-LOAD FILE"
270 PRINT"2-SAVE FILE"
280 INPUT A:IF A=2 THEN 410
290 GOSUB 340
300 ON MC GOTO 310,1300,1400,150
0
310 PRINT"ERROR":GOTO 100
340 ' LOAD FILE SUBROUTINE
345 INPUT"1-TAPE OR 2-DISK";A
347 IF A=2 THEN 390
350 INPUT"TURN TAPE RECORDER ON
& HIT      <ENTER>";A$
355 OPEN"I",-1,"TTDATA"
360 FOR I=1 TO 100
365 INPUT#-1,Q$(I,1),Q$(I,2),Q$(
```

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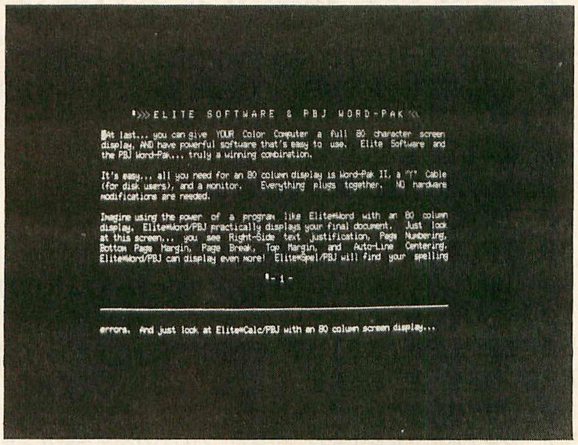

```
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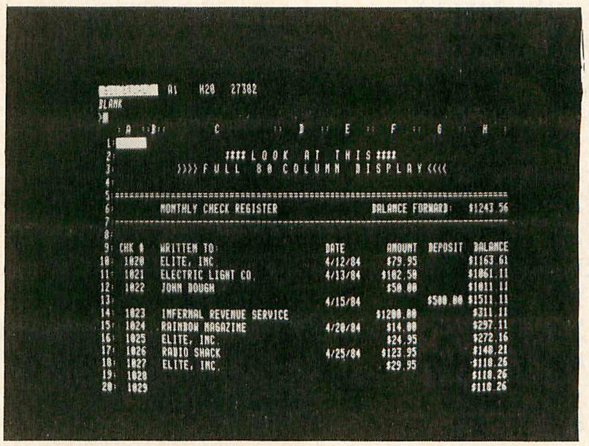

```
          A1   H20   27302
BLANK
>
   : A :: B ::         C          :: D :: E :: F :: G :: H :
 1:
 2:                    ###L O O K   A T   T H I S###
 3:           >>>>F U L L   8 0   C O L U M N   D I S P L A Y<<<<
 4:
 5:====================================================================
 6:          MONTHLY CHECK REGISTER                BALANCE FORWARD:  $1243.56
 7:--------------------------------------------------------------------
 8:
 9: CHK #   WRITTEN TO:                  DATE      AMOUNT  DEPOSIT  BALANCE
10:  1020   ELITE, INC.                 4/12/84     $79.95           $1163.61
11:  1021   ELECTRIC LIGHT CO.          4/13/84    $102.50           $1061.11
12:  1022   JOHN DOUGH                              $50.00           $1011.11
13:                                     4/15/84             $500.00 $1511.11
14:  1023   INFERNAL REVENUE SERVICE              $1200.00            $311.11
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19:  1028                                                             $118.26
20:  1029                                                             $118.26
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```
I,3),AN(I)
370 NEXT I
375 CLOSE-1
380 RETURN
390 INPUT"ENTER FILE NAME";F$
401 OPEN "I",1,F$
402 FOR I=1TO100
403 INPUT #1,Q$(I,1),Q$(I,2),Q$(
I,3),AN(I)
404 NEXT I
405 CLOSE 1
406 RETURN
410 ' SAVING THE FILE
415 INPUT"1-TAPE OR 2-DISK";A
420 IF A=2 THEN 460
425 INPUT"TURN TAPE RECORDER ON
RECORD &  HIT <ENTER>";A$
430 OPEN"O",-1,"TTDATA"
435 FOR I=1 TO 100
440 PRINT#-1,Q$(I,1),Q$(I,2),Q$(
I,3),AN(I)
445 NEXT I
450 CLOSE-1
455 GOTO 470
460 INPUT"ENTER FILE NAME";F$
464 OPEN "O",1,F$
465 FOR I=1TO100
466 WRITE #1,Q$(I,1),Q$(I,2),Q$(
I,3),AN(I)
467 NEXT I
468 CLOSE 1
470 PRINT"DATA LOADED"
475 INPUT"1-CONTINUE 2-QUIT";A
480 IF A=1 THEN 1500
490 STOP
500 CLS
510 PRINT"OK, HERE'S THE DEAL"
520 PRINT"THIS NEW FILE CAN TAKE
 100 MULTIPLE CHOICE QUESTIONS-E
ACH HAS 4 PARTS"
530 PRINT"1-CATEGORY OF QUESTION
-SUCH AS  HISTORY,PEOPLE,TV,SPOR
TS,COMICS"
535 PRINT"---MUST 7 OR LESS LETT
ERS"
540 PRINT"2-THE QUESTION--KEEP T
O ONE LINE  <32 LETTERS MAX>"
550 PRINT"3-THE CORRECT ANSWER"
560 PRINT"4-THREE BOGUS ANSWERS"
570 PRINT"THE COMPUTER WILL PUT
THESE ANSWERS IN RANDOM ORDER"
572 INPUT"HIT <ENTER> TO CONTINU
E";A$
575 PRINT"LENGTH OF THE 4 ANSWER
S MUST BE LESS THAN 2 LINES LONG
"
580 PRINT"BECAUSE OF THE WAY OUR
 COMPUTER TAKES DATA--DON'T USE
ANY COMMAS"
585 PRINT"IF YOU WANT TO QUIT EA
RLY, TYPE IN STOP WHEN IT ASKS F
OR CATEGORY"
590 PRINT"IF YOU DON'T LIKE THE
WAY THE   LAST QUESTION TURNED O
UT TYPE IN REDO"
600 A=TIMER
610 IF A>500 THEN A=A-500:GOTO61
0
620 FOR I=1 TO A:B=RND(A):NEXT
630 INPUT"PRESS <ENTER> TO START
";A$
700 K=1:CLS5
710 PRINT"QUESTION"K
720 INPUT"CATEGORY";A$
730 IF A$="STOP"THEN 1500
740 IF A$="REDO"THEN K=K-1:GOSUB
1100:GOTO950
750 IF LEN(A$)>7 THENPRINT"7 LET
TERS MAX PLEASE REDO":GOTO720
760 Q$(K,1)=A$
770 PRINT"ENTER THE QUESTION":IN
PUT A$
780 IF LEN(A$)>32 THENPRINT"THIS
 CAN BE ONLY 1 LINE, ACE":GOTO77
0
790 Q$(K,2)=A$
800 PRINT"ENTER THE CORRECT ANSW
ER":INPUT A$
810 PRINT"ENTER FIRST BOGUS ANSW
ER":INPUT B$
820 PRINT"ENTER ANOTHER BOGUS AN
SWER":INPUT C$
830 PRINT"ENTER ONE MORE BOGUS A
NSWER":INPUT D$
840 B=LEN(A$+B$+C$+D$)
845 IF B>52 THENPRINT"YOUR ANSWE
R IS"52-B"LETTERS TOO LONG-TRY A
GAIN":GOTO800
850 GOSUB 1000
860 IF L<27 AND LL<27 THEN 920
870 GOSUB 1000
880 IF L<27 AND LL<27 THEN 920
890 GOSUB 1000
895 IF L<27 AND LL<27 THEN 920
900 Q$(K,3)="1-"+R$(1)+" 2-"+R$(
2)+" 3-"+R$(3)+" 4-"+R$(4)
910 GOTO 950
920 D=27-L:A$="1-"+R$(1)+" 2-"+R
$(2)
930 FOR I=1 TO D:A$=A$+" ":NEXT
940 Q$(K,3)=A$+"3-"+R$(3)+" 4-"+
R$(4)
950 CLS RND(8)
960 PRINT Q$(K,1),AN(K)
970 PRINT Q$(K,2):PRINT Q$(K,3)
980 K=K+1:IF K>100 THENPRINT"FIL
E FULL!":GOTO 1700
```

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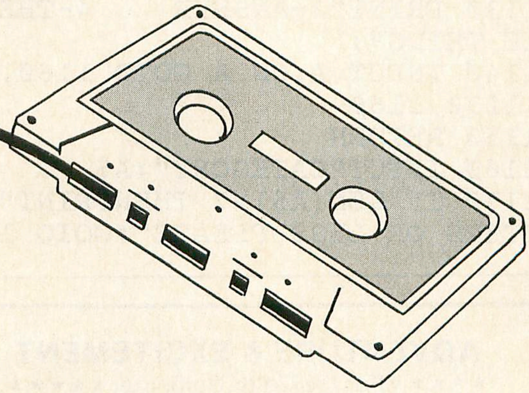

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```
990 GOTO 710
999 ' RANDOM ANSWER SUBROUTINE
1000 A=RND(4):AN(K)=A
1010 B=RND(3):IF B=A THEN B=B+1
1020 C=RND(2):IF C=B OR C=A THEN
 C=C+1
1030 IF C=B OR C=A THEN C=C+1
1040 D=10-A-B-C
1050 R$(A)=A$:R$(B)=B$:R$(C)=C$:
R$(D)=D$
1060 L=LEN(R$(1)+R$(2)):LL=LEN(R
$(3)+R$(4))
1070 RETURN
1100 CLS
1110 PRINT Q$(K,1):PRINT Q$(K,2)
:PRINT Q$(K,3)
1120 PRINT"DO YOU WANT TO CORREC
T"
1121 PRINT"1-CATEGORY  2-QUESTIO
N"
1130 PRINT"3-ANSWER    4-THE WHO
LE THING";
1140 INPUT A:ON A GOTO 1160,1190
,1230,1160
1150 RETURN
1160 INPUT"CATEGORY";A$
1170 IF LEN(A$)>7 THENPRINT"7 LE
TTERS OR LESS PLEASE":GOTO 1160
1180 Q$(K,1)=A$:IF A=1 THEN RETU
RN
1190 PRINT"QUESTION":INPUT Q$(K,
2)
1210 IF LEN(Q$(K,2))>32 THENPRIN
T"THIS ISN'T A NOVEL-1 LINE PLEA
SE":GOTO1190
1215 IF A=4 THEN 1230
1220 RETURN
1230 PRINT"ENTER ALL MULTIPLE CH
OICE      ANSWERS & NUMBERS":IN
PUT A$
1240 IF LEN(A$)>64 THENPRINT"THA
T'S TOO LONG-REDUCE TO 2 LINES":
GOTO1230
1250 IF A=3 THEN 1270
1270 Q$(K,3)=A$
1280 INPUT"WHICH IS THE CORRECT
ANSWER";B
1290 IF B<1 THEN 1280
1295 AN(K)=B:RETURN
1299 'MODIFY OR CORRECT
1300 CLS:PRINT"ENTER 999 TO SCRO
LL THRU ALL    QUESTIONS"
1310 PRINT"ENTER QUESTION # TO M
ODIFY       0 TO STOP";
1320 INPUT K
1330 IF K=999 THEN 1600
1340 IF K=0 THEN 1500
1350 GOSUB 1100
1360 GOTO 1310
1399 ' ADD TO EXISTING FILE
1400 PRINT"LOAD EXISTING FILE"
1420 K=1
1430 IF Q$(K,1)="XXXXXXX" THEN 1
460
1440 K=K+1:IF K<=100 THEN 1430
1450 PRINT"FILE IS FULL":GOTO170
0
1460 CLS5
1470 GOTO 710
1499 ' SECONDARY MENU
1500 CLS 5
1510 PRINT"1-MODIFY OR CORRECT"
1520 PRINT"2-ADD TO THIS FILE"
1530 PRINT"3-SCROLL THRU ALL QUE
STIONS"
1540 PRINT"4-TERMINATE PROGRAM"
1550 INPUT MS
1560 ON MS GOTO 1310,1420,1600,1
700
1570 GOTO 1500
1599 '  SCROLL
1600 PRINT"THIS OPTION WILL PAGE
 THRU ALL  QUESTIONS-4 AT A TIME
"
1610 PRINT"ENTER S TO STOP-ANY O
THER KEY TO CONTINUE"
1620 INPUT"HIT <ENTER> TO BEGIN
```

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```
PAGING";A$
1625 CLS
1630 FOR I=1 TO 100
1640 PRINT I,Q$(I,1)
1650 PRINT Q$(I,2):PRINT Q$(I,3)
1660 IF INT(I/4)<>I/4 THEN 1690
1670 I$=INKEY$
1680 IF I$="" THEN 1670
1685 IF I$="S" THEN 1500
1690 NEXT I
1695 GOTO 1500
1699 ' TERMINATE
1700 INPUT"1-SAVE FILE      2-JUS
T STOP";A
1710 IF A=2 THEN STOP
1740 GOTO 410
1750 END
```

Editor's Note: The text that follows is the sample data file for this program. You can type it in using a word processor, and save it on disk in ASCII, or you can use it as a reference when running Listing 2 to create a file.

Listing 3: TRIVDATA

```
 "PEOPLE","WHO WAS THE ELEPHANT MAN","1-
JOHN MERRICK 2-JIM MORRISON   3-BEN HOAR
Y 4-ORSON WELLS", 1
"HISTORY","LED RAID ON HARPERS FERRY 185
9","1-VALERIE HARPER 2-GEN SHERMAN 3-JOH
N BROWN 4-STONEWALL JACKSON", 3
"WORLD","IDI AMIN WAS DICTATOR OF","1-SW
EDEN 2-UGANDA                 3-ANGOLA 4-L
IBYA", 2
"TV","MURRAY THE COP IS FROM","1-BARNEY
MILLER 2-MAYBERRY RFD  3-ODD COUPLE 4-AR
CHIE BUNKER", 3
"USA","STATUE OF LIBERTY IS MADE OF","1-
WOOD 2-COPPER                   3-STONE 4-
MARSHMELLOWS", 2
"BOOKS","BILBO BAGGINS COUSIN","1-DONALD
 2-GOLLUM              3-FRODO 4-ROLLO"
, 3
"MUSIC","BRIAN WILSONS GROUP","1-BEACH B
OYS 2-BEEGEES          3-DOORS 4-LED ZEP
PELIN", 1
"SPORTS","PANCHO GONZALES PLAYS","1-TENN
IS 2-BASEBALL              3-SOCCER 4-GOL
F", 1
"INVENT","INVENTED THE ELECTRIC RAZOR","
1-K GILLETTE 2-JACOB SCHICK     3-WILSON
 YOUNG 4-GABBY HAYES", 2
"ANIMALS","WHICH IS NOT A REPTILE","1-SA
LAMANDER 2-IGUANA             3-CHAMELEON
4-RATTLESNAKE", 1
"CARS","WHO MAKES THE GLC","1-MAZDA 2-VO
LVO                    3-AMC 4-GMC", 1
"GEOG","WHERE IS THE BLACK FOREST","1-GE
RMANY 2-USSR                 3-FINLAND 4-
ANGOLA", 1
"MOVIES","STAR OF BECKET","1-PETER OTOOL
E 2-REX HARRISON    3-ED ASNER 4-R BURTON
", 4
"CAPITAL","CAPITAL OF AUSTRALIA","1-CANB
ERRA 2-AUCKLAND            3-SYDNEY 4-PER
TH", 1
"LEGENDS","SON OF SIR LANCELOT","1-JUNIO
R 2-ULYSSES                 3-GUY 4-GALAHAD
", 4
"PRES","JACKIE KENNEDYS MAIDEN NAME","1-
BOUVIER 2-STAPLES              3-ONASSIS
4-FENWICK", 1
"SPOUSES","FORMER WIFE OF CARY GRANT","1
-DYAN CANNON 2-ANGIE DICKENSON 3-JEAN SI
MMONS 4-EVA GABOR", 1
"COMICS","BROOM HILDAS FRIEND","1-MAYNAR
D 2-FRED                    3-GAYLORD 4-CASP
ER", 3
"MEDICAL","DISEASE OF GUMS","1-PHLEBITIS
 2-DOUBLEMINT          3-PLEURISY 4-PYORRH
EA", 4
"DISNEY","VOICE OF DONALD DUCK","1-WALTE
R LANTZ 2-WALT DISNEY     3-CLARENCE NASH
 4-MEL BLANC", 3
"PEOPLE","KNOWN AS GENTLEMAN JIM","1-JIM
```

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```
MY SNYDER 2-JIM PRICE      3-JIM NAYBORS
 4-JAMES CORBETT", 4
"HISTORY","DEFEATED NAPOLEON AT WATERLOO
","1-HENRY 2-WELLINGTON             3-EDW
ARD 4-HANNIBAL", 2
"WORLD","WHERE IS COPACABANA BEACH","1-R
IO DE JANEIRO 2-HAWAII       3-CUBA 4-HO
LLYWOOD", 1
"TV","ON WHAT SHOW IS PIGS IN SPACE","1-
SOLID GOLD 2-GREEN ACRES      3-STAR TRE
K 4-MUPPETS", 4
"USA","DISCOVERED THE COLUMBIA RIVER","1
-CAPT ROBT GRAY 2-WM COLUMBIA  3-LEWIS &
 CLARK 4-HARRY TRUMAN", 1
"BOOKS","AUTHOR OF BRAVE NEW WORLD","1-H
.G.WELLS 2-GERALD BROWN      3-ALDOUS HU
XLEY 4-LAURA HOBSON", 3
"MUSIC","KAREN CARPENTERS BROTHER","1-WI
LL 2-BOB                    3-CLAUDE 4-R
ICHARD", 4
"SPORTS","LOCATION OF FENWAY PARK","1-CH
ICAGO 2-BALTIMORE            3-SAN DIEGO
4-BOSTON", 4
"SCIENCE","OSTEOLOGY IS THE STUDY OF","1
-BLENDERS 2-FISH               3-BONES 4
-BIRDS", 3
"ANIMALS","LARGEST LAND CARNIVORE","1-JO
HN BELUSHI 2-KODIAK BEAR    3-RHINOCEROU
S 4-GRIZZLY BEAR", 2
"CARS","WHO MAKES THE SILVER SPIRIT","1-
SUBARU 2-FORD                 3-ROLLS RO
YCE 4-TOYOTA", 3
"GEOG","WHERE IS BOTSWANA","1-MIDDLE EAR
TH 2-SOUTH AFRICA   3-ASIA 4-ORIENT", 2
"MOVIES","WHO PLAYED THE WIZARD OF OZ","
1-DICK CLARK 2-FRANK MORGAN     3-RAY BO
LGER 4-JACK HALEY", 2
"CAPITAL","CAPITAL OF WISCONSIN","1-MILW
AUKEE 2-ROCKFORD          3-MADISON 4-CO
LUMBUS", 3
"LEGENDS","GREEK KING WHO FOUGHT TROJANS
","1-AGAMEMNON 2-ULYSSES           3-ALE
XANDER 4-APOLLO", 1
"PRES","KNOWN AS OLD ROUGH & READY","1-H
ERBERT HOOVER 2-ZACH TAYLOR  3-F.D.ROOSE
VELT 4-GERALD FORD", 2
"SPOUSES","FORMER HUSBAND OF JULIE LONDO
N","1-JACK WEBB 2-JOHN WARNER        3-XA
VIER CUGAT 4-WOODY ALLEN", 1
"COMICS","DAGWOODS BOSS","1-LOU GRANT 2-
MR BEASLEY        3-MR DITHERS 4-MR BIGD
OME", 3
"SPACE","MAKEUP OF THE SUN","1-HYDROGEN
2-OXYGEN             3-AMMONIA 4-URANIUM
", 1
"DISNEY","DUMBOS MOUSE FRIEND","1-THUMPE
R 2-SPEEDY              3-JERRY 4-TIMOTH
Y", 4
"PEOPLE","WHO WAS KNOWN AS SCARFACE","1-
MUSSOLINI 2-BUGSY MALONE      3-AL CAPON
E 4-QUASIMOTO", 3
"HISTORY","TRIED TO BLOW UP HOUSE OF LOR
DS","1-RICHARD STARKY 2-GUY FAWKES 3-O
LIVER CROMWELL 4-JOHN CALVIN", 2
"WORLD","ANWAR SADAT'S COUNTRY","1-TURKE
Y 2-IRAQ                 3-EGYPT 4-ISREA
L", 3
"TV","D.A. IN PERRY MASON","1-PERRY WHIT
E 2-IRONSIDE        3-HAMILTON BURGER 4-
PAUL DRAKE", 3
"USA","TERM FOR A U.S. SENATOR","1-4 YRS
. 2-2 YRS.               3-6 YRS. 4-LIFE
", 3
"BOOKS","OCCUPATION OF BOB CRATCHET","1-
BANK TELLER 2-SCHOOL TEACHER 3-FARMER 4
-CLERK", 4
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 2-HAIR  3-DIZZY    4-GOIN UP TO THE
 COUNTRY", 2
"SPORTS","DIXIE WALKER PLAYS","1-GOLF 2-
TENNIS                 3-BASEBALL 4-BASK
ETBALL", 3
"INVENT","INVENTOR OF THE CLOCK","1-GEOR
GE WALTHAM 2-THE CHINESE  3-BEN FRANKLIN
 4-WILL SMITH", 2
"ANIMALS","WHAT IS AN EMU","1-REPTILE 2-
ANTELOPE            3-LARGE BIRD 4-INSEC
T", 3
"CARS","WHO MAKES THE MONDIAL","1-PEUGEO
T 2-FERRARI             3-CHEVY 4-CADILL
AC", 2
"GEOG","SHARES ISLAND WITH HAITI","1-JAM
AICA 2-NEW GUINEA          3-DOMINICAN R
EPUBLIC 4-BORNEO", 3
"MOVIES","DIRECTOR OF STAR TREK III","1-
GENE RODDENBERRY 2-GEO LUCAS  3-LEONARD
NEMOY 4-ARTHUR HILLER", 3
"CAPITAL","CAPITAL OF PORTUGAL","1-MADRI
D 2-PORTO                3-LISBON 4-GIBR
ALTER", 3
"LEGENDS","FLEW TOO CLOSE TO THE SUN","1
-PINOCCHIO 2-ICARUS             3-PROMETH
EUS 4-JOHN GLENN", 2
"PRES","WHO SHOT PRESIDENT REAGEN","1-MA
RK CHAPMAN 2-JAMES EARL RAY 3-SIRHAN SIR
HAN 4-JOHN HINKLEY", 4
"SPOUSES","FORMER HUSBAND OF URSULA ANDR
ES","1-JOHN HUSTON 2-DEAN MARTIN     3-D
ICK POWELL 4-JOHN DEREK", 4
"COMICS","BATMAN'S TRUE IDENTITY","1-LAM
ONT CRANSTON 2-BRUCE WAYNE 3-DICK GRAYSO
N 4-CLARK KENT", 2
"MEDICAL","ADENOIDS ARE LOCATED IN THE",
"1-FOOT 2-THROAT                 3-INTES
TINES 4-LIVER", 2
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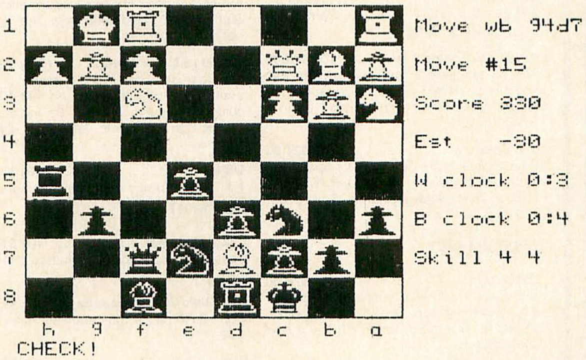

```
Move wb g4d7
Move #15
Score 330
Est    -30
W clock 0:3
B clock 0:4
Skill 4 4
CHECK!
```

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ND 2-FRANCE                3-USA 4-CHILE",
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GROVE 4-HOOTERVILLE", 4
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UNTAINS 2-YOSEMITE   3-YELLOWSTONE 4-ZIO
N", 3
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EA 4-CLAUDE DEBUSSY", 4
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X 2-BLACK HAWKS          3-BEARS 4-BRUINS
", 2
"INVENT","EDISON DID NOT INVENT THE","1-
ELECTRIC LAMP 2-PHONOGRAPH    3-RADIO 4-
MOVIE CAMERA", 3
"ANIMALS","A COATIMUNDI IS RELATED TO TH
E","1-RACCOON  2-KIWI                3-PY
THON   4-OAK TREE", 1
"CARS","WHO MAKES THE SKYHAWK","1-ASTON
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CK", 4
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MOON 2-WEST AFRICA         3-INDIA 4-NEW
ZEALAND", 4
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CONCORD 2-WEBSTER              3-MONTPELI
ER 4-BOSTON", 1
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CAMELOT            3-ROME 4-ATHENS", 1
"PRESDNT","G WASHINGTON'S POLITICAL PART
Y","1-FEDERALIST 2-WHIG              3-DE
MOCRATIC 4-REPUBLICAN", 1
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E LANGE 4-AVA GARDNER", 2
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EBUCHADNEZZER          3-DARIUS 4-PTOLMY",
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PLE 4-NEL ROSS", 1
"BOOKS","EGG HATCHING ELEPHANT","1-HORTO
N 2-DUMBO                3-GROUCHO 4-SID
NEY", 1
"MUSIC","FOGERTY BROTHERS PLAYED WITH","
1-DOORS 2-ALLMAN BROS            3-CREEDE
NCE 4-EAGLES", 3
"SPORTS","CY YOUNG AWARD IS FOR","1-PITC
HING 2-FIELDING            3-KICKING 4-TE
NNIS", 1
"SCIENCE","ICHTHYOLOGY IS THE STUDY OF",
"1-REPTILES 2-DUNG                3-BUGS
4-FISH", 4
"ANIMALS","WHICH IS A CARNIVORE","1-ORYX
 2-MONGOOSE                3-WALLABY 4-YA
K", 2
"CARS","WHO MAKES THE BRAT","1-SUBARU 2-
NISSAN               3-JEEP 4-ALPHA ROME
O", 1
"GEOG","1ST COUNTRY SOUTH OF DETROIT","1
-HAITI 2-BRAZIL                3-CANADA
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"MOVIES","STAR OF DUAL IN THE SUN","1-GR
EG. PECK 2-DENNIS WEAVER    3-JIMMY STUA
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JUPITER 2-NEPTUNE              3-ODIN 4-A
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T", 3
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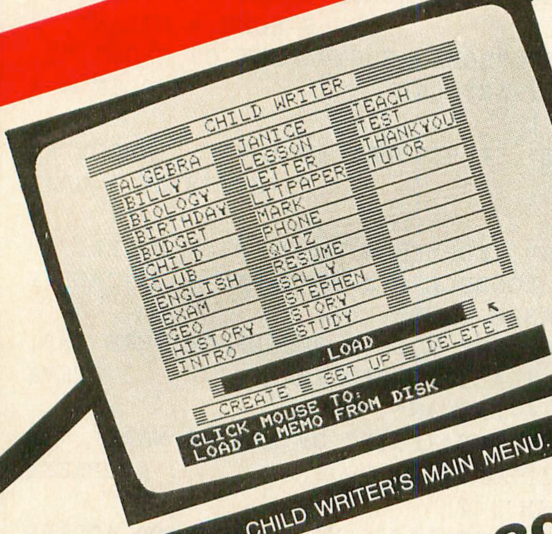
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BILLY
BIOLOGY
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CLUB
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GEO
HISTORY
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JANICE
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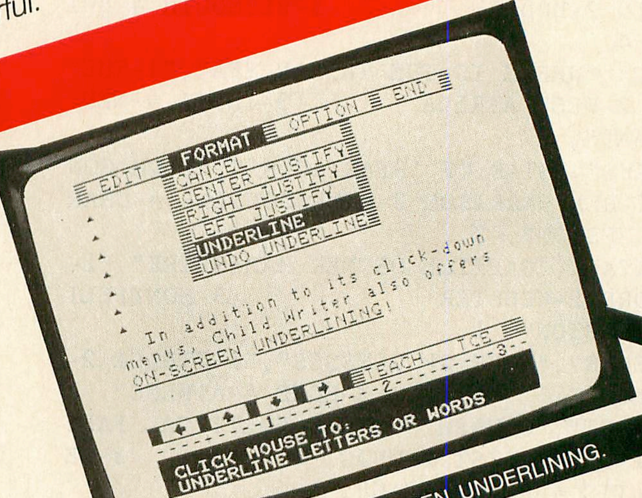
LETTER
LITPAPER
MARK
PHONE
QUIZ
RESUME
SALLY
STEPHEN
STORY
STUDY
TEACH
TEST
THANKYOU
TUTOR
LOAD
CREATE
SET UP
DELETE

CLICK MOUSE TO:
LOAD A MEMO FROM DISK

CHILD WRITER'S MAIN MENU.


EDIT
FORMAT
OPTION
END
CANCEL
CENTER JUSTIFY
RIGHT JUSTIFY
LEFT JUSTIFY
UNDERLINE
UNDO UNDERLINE
TEACH
TCE

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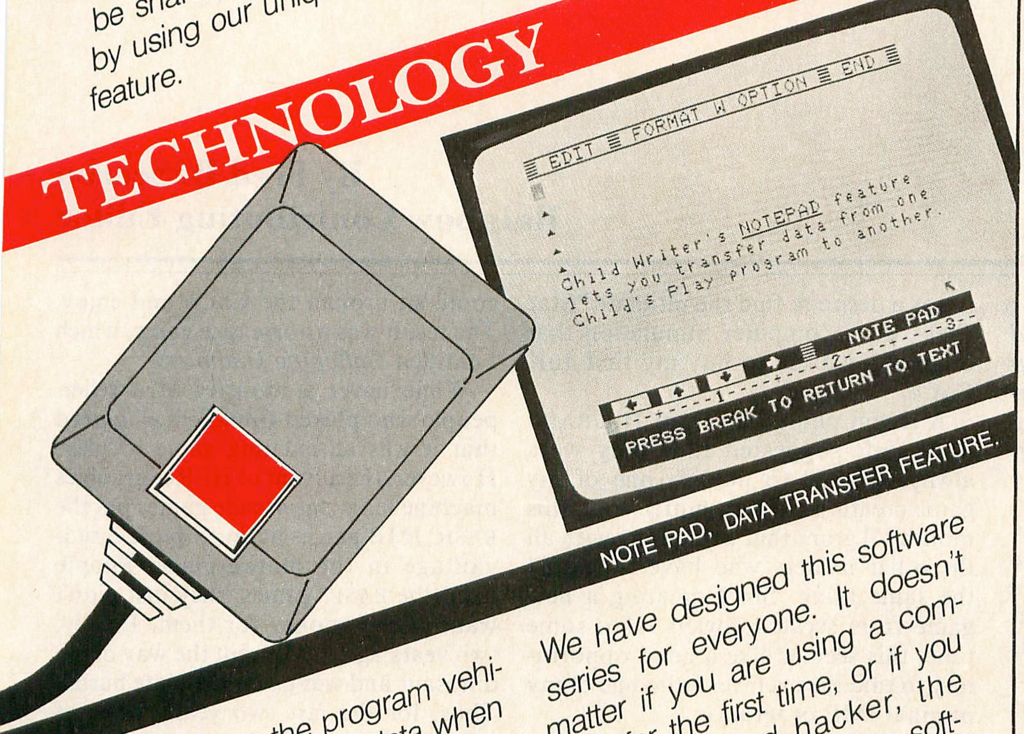
EDIT ≡ FORMAT W OPTION ≡ END ≡
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PRESS BREAK TO RETURN TO TEXT

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Fun For The Whole Family With Galloping Gamblers

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget that this is BASIC. All programs resulting from your wishes are for your use but remain the property of the author.

Christmas is traditionally a time for giving and sharing. While the "Wishing Well" is always a source of sharing for those who regularly read THE RAINBOW, I thought this holiday season would be an extra special time to offer all of my friends one of my most popular family game programs from the past: *Galloping Gamblers*.

The Wish

I don't like getting stuck with a label such as "game programmer," but I have to admit that if it weren't for microcomputer games, I might never have gotten this deeply involved with writing software for the Color Computer. In fact, it was a desire to find the ultimate "Star Trek" microcomputer Simulation that originally led me to buy my first 16K CoCo.

A recent phone call from THE RAINBOW staff suggested that they were always thrilled to publish one of my game creations. (Hint, hint!) Well, this month I'll grant that wish along with all the other readers who have suggested the same thing. Since creating a new game from scratch always takes some time, this seemed like a good opportunity to raid the archives from one of my original IMB programs.

Not So Ancient History

The first program I ever published for the CoCo was a game called *Meteor Storm*, which was released under the publishing name of IMB (Illustrated Memory Banks). Most of my game writing is graphics, so my brother suggested the "Illustrated" title and chose IMB because it reminded him a little of another computer giant with similar letters. Since little software was available for the CoCo at the time, a number of people grabbed the opportunity to get a copy of *Meteor Storm* when it came out.

As a follow-up to *Meteor Storm*, I wrote a game that a number of people could sit around the CoCo and enjoy. The result was a horse race game, which I entitled *Galloping Gamblers*.

While never a monster of a seller, people who played *Gamblers* all agreed that it was an exciting game to play. However, the advent of Hi-Res graphics machine language arcade games put the BASIC IMB games at an extreme disadvantage in the marketplace. People liked the BASIC games, they just didn't want to pay money for them. Finally, two years ago, IMB went the way of the dinosaur and was given a private burial. Thus, for the last two years, none of these programs have been available.

Even though BASIC games do not have a chance in the marketplace, BASIC programming is still a vitally important option available to all home computer owners. Only by showing what can be milked out of a computer in BASIC can we later appreciate what assembly code and machine language programming are capable of doing.

Even though the IMB programs couldn't compete for the dollar of CoCo owners, that does not mean they cannot be an interesting addition to a CoCo owner's software library. Besides, the number of CoCo owners has escalated since the last time these programs were available. A whole new audience of

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(Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Mass. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

CoCo owners never had a chance to try these and see what CoCo's humble beginnings were like. Therefore, as time and space permit, I will offer some of those better programs in these pages. *Gamblers* is the first of these IMB programs that will be given new life for those interested in trying them for the purchase price of a copy of THE RAINBOW or RAINBOW ON TAPE. (This doesn't mean I don't want your wishes. They will still provide the bulk of the "Wishing Well's" material.)

The Program

In giving new life to *Galloping Gamblers*, there have been a number of changes made in the original program. The original *Gamblers* had an IMB game opening done totally in graphics. This slightly rewritten version uses a text graphics title page, which is now familiar to most RAINBOW readers. Other modifications have also been made to make the program run a little more efficiently.

You will notice that *Gamblers* is also not the most efficiently written code compared to the programs usually listed in the "Wishing Well." While I have cleaned up some of the most noticeably sloppy areas, you will see how confusing a program can be if GOSUBs are overused. I could have taken the time to completely rewrite the code, but that would have defeated the purpose of listing *Gamblers*.

Therefore, consider the listing to be an example of how far we have all come in what can be accomplished with our built-in BASIC. Although the code does not follow completely from top to bottom, it does work without error. That is the beauty of BASIC. You can break the rules of structure and still have an error-free program. (Structured programming advocates would also point that out as its weakness.)

Typing in the Program

Since the program does call several high number GOSUBs, be careful not to try running the program before it is all typed in. If the program should lock up on you, press Reset to regain control of the text screen. Any sections of the listing that appear in lowercase may be typed in by pressing SHIFT and '0' to enter that mode, and SHIFT and '0' to return from it.

Also, be sure to save the program before running it. If you make an error on one of the POKE commands, you could lose all your work in the blink of an eye. Be careful in the DATA statements as well, since some contain what may appear to be misplaced commas. These are not mistakes. The values READ here are simply zero, so we are trying to save a little memory.

Running the Program

On running *Gamblers*, a colorful title card appears asking you to select from one to four players; simply press the number you desire. The text screen displays a betting board. Located at the bottom of the screen are the pay-off odds for each of the four horses. Press the number of the horse you wish to wager on, but do *not* press ENTER. If you do, you may accidentally bet zero dollars on the horse.

When the prompt appears, enter your dollar bet in whole numbers and press ENTER. The next player may now bet as player two. If no others are playing, the pink screen will turn green and pause while the graphics screen prepares the track.

When the track is ready, you will hear the familiar race track song. The race will start and you will hear each horse gallop around the screen. You may keep track of your horse by the number of the lane it is in. (Don't worry, the inside track is no advantage.) When one horse crosses the finish line, you will see a graphic flashing. Wait about 15 seconds and press ENTER to return to the betting card. You will now go on to the next race, of which there are 12.

Once you have lost your money, you must still select a horse for your turn, but you must enter zero (0) for your bet. After the last race, you may restart the game by pressing ENTER. Sorry, but your winnings may not be caried over to the next game.

Conclusion

One thing you will notice when playing this game is that the participants quite often forget it is a game and start screaming at their horse to move — that's the fun of *Galloping Gamblers*. It can be played with almost any age, whether at a party or a family get-together. At a time when some people complain that families do not spend enough time together, consider *Gamblers* my Christmas gift to your family to help increase those leisure times. Happy holidays to all of you.

Next month: I am just putting the finishing touches on something that a number of you have been suggesting for a long time. Next month's "Wishing Well" will show my first Adventure game, which will be of an educational nature. Until then, keep those wishes coming. ☐

40	135	395	192
85	113	430	240
165	205	515	183
255	58	END	180
310	167		

The listing: GAMBLERS

```
1 '****************************
2 '* GALLOPING GAMBLERS (V.2) *
3 '* COPYRIGHT (C) 1982,1985  *
4 '*     BY FRED B. SCERBO    *
5 '* 60 HARDING AV.N.ADAMS,MA *
6 '****************************
10 CLEAR520:CLS0:PRINTSTRING$(32
,175);:GOSUB15:PRINTSTRING$(32,1
28);:GOSUB15:PRINTSTRING$(32,175
);:GOTO60
15 FORI=1TO4:FORY=1TO32:READA:PR
INTCHR$(A+128);:NEXTY:GOSUB520:N
EXTI:RETURN
20 DATA,83,83,82,81,83,83,,82,,,
82,,,83,83,83,,83,83,83,,82,,82,
,,82,81,83,83,
25 DATA,90,,,85,,85,,90,,,90,,,9
0,,85,,90,,85,,90,,94,82,,90,85,
,,
30 DATA,90,84,90,85,92,93,,90,,,
90,,,90,,85,,94,92,92,,90,,90,84
,82,90,85,,93,
35 DATA,91,83,90,85,,85,,91,83,,
91,83,,91,83,87,,90,,,,90,,90,,8
```

```
4,90,85,83,87,
40 DATA,126,124,120,117,124,125,
,123,,,113,122,117,124,124,121,,
122,,,126,124,120,117,124,124,12
2,117,124,124,
45 DATA,122,113,114,117,115,119,
,122,121,113,120,122,117,115,115
,118,,122,,,123,115,114,117,115,
115,122,117,115,115,
50 DATA,122,,122,117,,117,,122,,
120,,122,117,,117,122,,122,,,
117,,121,,,,117,
55 DATA,124,124,120,116,,116,,12
0,,,,120,116,124,124,120,,124,12
4,,124,124,120,116,,,120,116,124
,124,
60 PRINT@391," BY FRED B.SCERBO
";:PRINT@423,"  (C) 1982,1985
";:PRINT@455,"  PLAYERS (1-4)
";
65 GN=1:V1=100:V2=100:V3=100:V4=
100:NA$="R3LU5G":NB$="R3NUL3E3UH
LGD":NC$="UFREUHNLEHLG":ND$="R3L
U5G2DR3"
70 PQ$="C7U5R2FDGL2D2RBR4NU5R3BR
2U4ERFD2NL3D2BR4U2LHNU2FR2EU2BR2
":PE$="NR2D2NR2D3R2BR2U5R2FDGNL2
FD":P$=PQ$+PE$:UP$="BR3NHREUHGHU
ERF"
75 DIMA(25),B(25),C(25),D(25),E(
25),F(25),G(25),H(25):M=0:FORI=7
2TO184STEP16:M=M+1:A(M)=I:C(M)=I
:E(M)=I:G(M)=I:B(M)=55:D(M)=63:F
(M)=73:H(M)=82:NEXT
80 FORI=8TO16:READX
85 A(I)=X:NEXT
90 DATA194,216,233,247,250,247,2
33,216,194
95 FORI=8TO16:READX
100 B(I)=X:NEXT
105 DATA56,64,78,98,120,142,162,
176,184
110 M=16:FORI=184TO72STEP-16:M=M
+1:A(M)=I:B(M)=186:C(M)=I:E(M)=I
:G(M)=I:D(M)=177:F(M)=168:H(M)=1
59:NEXT
115 FORI=8TO16:READX:C(I)=X:NEXT
120 DATA192,210,229,237,240,237,
229,210,192
125 FORI=8TO16:READX:D(I)=X:NEXT
130 DATA64,71,85,101,120,139,155
,169,176
135 FORI=8TO16:READX:E(I)=X:NEXT
140 DATA188,200,216,226,230,226,
218,202,190
145 FORI=8TO16:READX:F(I)=X:NEXT
```

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```
150 DATA74,79,88,105,120,135,149
,161,168
155 FORI=8TO16:READX:G(I)=X:NEXT
160 DATA186,198,210,216,220,218,
212,198,186
165 FORI=8TO16:READX:H(I)=X:NEXT
170 DATA83,87,96,108,120,132,144
,154,159
175 GA$="HLGD3FREUNLBRD2U4ERFD2N
L3D2BR":GL$="NU5R3U2DBR":OP$="NF
U3ERFD3GLBR3U5R2FDGL2D2BR4":IN$=
"NU5BR3U5F3U3D5BR4EUNLDGLHU3ERF"
:GM$="U5F2E2D5BRU5R2FGNL2FDGL2BR
4":GE$="U4NR3D2NR3D3R3BRU5R2FDGN
L2FD":GX$=GA$+GL$+"D"+GL$+OP$+IN
$:GY$=GA$+GM$+GL$+GE$+UP$
180 L$=INKEY$:HU=RND(-TIMER):IFL
$="1"THEN190ELSEIFL$="2"THEN195E
LSEIFL$="3"THEN200ELSEIFL$="4"TH
EN205
185 GOTO180
190 Y=1:GOTO210
195 Y=2:GOTO210
200 Y=3:GOTO210
205 Y=4:GOTO210
210 GOTO410
215 PMODE3,1:PCLS1:SCREEN0,0
220 Q=78:Q1=.25:Q2=.75:GOSUB225:
Q=176:Q1=.75:Q2=.25:GOSUB225:GOT
O230
225 FORI=80TO40STEP-10:CIRCLE(Q,
120),I,4,.9,Q1,Q2:NEXT:RETURN
230 LINE(78,49)-(176,49),PSET:LI
NE(78,192)-(176,192),PSET:PAINT(
80,51),2,4
235 READA:IFA=9THEN255
240 LINE(78,A)-(176,A),PSET
245 GOTO235
250 DATA58,67,76,85,182,173,164,
155,9
255 PAINT(80,87),3,4
260 DRAW"S16BM69,100C2"+GX$:DRAW
"BM72,128"+GY$
265 FORI=12TO48STEP12:I$=STR$(I)
:DRAW"S8BM40,"+I$+"C7"+P$:NEXT
270 DRAW"S8BM110,12C6"+NA$:DRAW"
BM110,24"+NB$:DRAW"BM110,36"+NC$
:DRAW"BM110,48"+ND$
275 LINE(0,112)-(40,128),PRESET,
BF:LINE(0,112)-(40,128),PSET,B:F
ORI=9TO29STEP10:LINE(I,112)-(I,1
28),PSET:NEXT
280 DRAW"S8BM0,125C3"+NA$:DRAW"B
M10,125"+NB$:DRAW"BM20,125"+NC$:
DRAW"BM30,125"+ND$
285 LINE(80,49)-(80,85),PSET:LIN
E(80,192)-(80,155),PSET
290 FORI=12TO48STEP12:I$=STR$(I)
:DRAW"S8BM128,"+I$+"C7"+PQ$+"D5C
```

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```
7"+IN$:NEXT
295 DRAW"BM202,12;C2"+JW$:DRAW"B
M202,24;"+JX$:DRAW"BM202,36;"+JY
$:DRAW"BM202,48;"+JZ$
300 PMODE3,1:SCREEN1,0
305 R=1:Q=1:S=1:T=1
310 CIRCLE(A(1),B(1)),3,3:CIRCLE
(C(1),D(1)),3,3:CIRCLE(E(1),F(1)
),3,3:CIRCLE(G(1),H(1)),3,3:PLAY
"V30L8O3CFAO4CL16CCCCO3L8AL16AAA
AL8FAFCP1F"
315 W=RND(4):IFW=1GOSUB330ELSEIF
W=2THENGOSUB335ELSEIFW=3THENGOSU
B340ELSEIFW=4THENGOSUB345
320 IFQ=24THEN355ELSEIFR=24THEN3
60ELSEIFS=24THEN365ELSEIFT=24THE
N370
325 GOSUB520:GOTO315
330 CIRCLE(A(Q),B(Q)),3,2:Q=Q+1:
CIRCLE(A(Q),B(Q)),3,3:RETURN
335 CIRCLE(C(R),D(R)),3,2:R=R+1:
CIRCLE(C(R),D(R)),3,3:RETURN
340 CIRCLE(E(S),F(S)),3,2:S=S+1:
CIRCLE(E(S),F(S)),3,3:RETURN
345 CIRCLE(G(T),H(T)),3,2:T=T+1:
CIRCLE(G(T),H(T)),3,3:RETURN
350 FORI=1TO16:PMODE3,1:SCREEN1,
1:SOUNDRND(220),1:PMODE4,1:SCREE
N1,1:SOUNDRND(220),1:NEXT:RETURN
355 GOSUB350:O5=O1:W8=1:GOTO375
360 GOSUB350:O5=O2:W8=2:GOTO375
365 GOSUB350:O5=O3:W8=3:GOTO375
370 GOSUB350:O5=O4:W8=4:GOTO375
375 IF J1=W8 THEN V1=V1+(K1*O5)
ELSE V1=V1-K1
380 IF J2=W8 THEN V2=V2+(K2*O5)
ELSE V2=V2-K2
385 IF J3=W8 THEN V3=V3+(K3*O5)
ELSE V3=V3-K3
390 IF J4=W8 THEN V4=V4+(K4*O5)
ELSE V4=V4-K4
395 GN=GN+1:Q=1:R=1:S=1:T=1:REST
ORE
400 FORI=1TO328:READA:NEXT
405 IFINKEY$<>CHR$(13)THEN405
410 CLS0:POKE&H167,&H39:FORUD=10
24TO1535:POKEUD,32:NEXTUD:SCREEN
0,1:WQ=49:FORUD=96TO288STEP64:PR
INT@UD,"player";:POKEUD+1030,WQ:
WQ=WQ+1:NEXTUD:PRINT@51,"bet";:P
RINT@57,"amount";:PRINT@43,"cash
";
415 PRINT@104,USING"$######.##";
V1;:PRINT@168,USING"$######.##";
V2;:PRINT@232,USING"$######.##";
V3;:PRINT@296,USING"$######.##";
V4;:IFGN=13THEN525
420 WQ=49:FORUD=354TO375STEP7:PR
INT@UD,"horse";:POKE1029+UD,WQ:W
```

```
Q=WQ+1:NEXTUD:PRINT@459,"race"GN
;
425 O1=RND(25):O2=RND(25):O3=RND
(25):O4=RND(25):TA$=STR$(O1):TB$
=STR$(O2):TC$=STR$(O3):TD$=STR$(
O4):B$=":1":PRINT@386,TA$+B$;:PR
INT@393,TB$+B$;:PRINT@400,TC$+B$
;:PRINT@407,TD$+B$;
430 GOSUB535:J1=QW:POKE1140,48+J
1
435 IFJ1=1THENJW$=NA$ELSEIFJ1=2T
HENJW$=NB$ELSEIFJ1=3THENJW$=NC$E
LSEIFJ1=4THENJW$=ND$
440 PRINT@119,"$ ";:LINEINPUTK$:
K1=VAL(K$)::IF K1>V1 THEN440
445 PRINT@119,"$"K1:IFY=1THEN215
450 GOSUB535:J2=QW:POKE1204,48+J
2
455 PRINT@183,"$ ";:LINEINPUTK$:
K2=VAL(K$):IF K2>V2 THEN455
460 PRINT@183,"$"K2
465 IFJ2=1THENJX$=NA$ELSEIFJ2=2T
HENJX$=NB$ELSEIFJ2=3THENJX$=NC$E
LSEIFJ2=4THENJX$=ND$
470 IFY=2THEN215
475 GOSUB535:J3=QW
480 IFJ3=1THENJY$=NA$ELSEIFJ3=2T
HENJY$=NB$ELSEIFJ3=3THENJY$=NC$E
LSEIFJ3=4THENJY$=ND$
485 POKE1268,J3+48::PRINT@247,"$
 ";:LINEINPUTK$:K3=VAL(K$):IFK3>
V3 THEN485
490 PRINT@247,"$"K3
495 IFY=3THEN215
500 GOSUB535:J4=QW
505 IFJ4=1THENJZ$=NA$ELSEIFJ4=2T
HENJZ$=NB$ELSEIFJ4=3THENJZ$=NC$E
LSEIFJ4=4THENJZ$=ND$
510 POKE1332,J4+48:PRINT@311,"$
";:LINEINPUTK$:K4=VAL(K$):IF K4>
V4 THEN510
515 PRINT@311,"$"K4:GOTO215
520 FORPP=1TO3:PLAY"V31O1L155CP1
30":NEXTPP:PLAY"L130CDEF":RETURN
525 PRINT@461,"closed";
530 IFINKEY$<>CHR$(13)THEN530ELS
ERUN
535 QW$=INKEY$
540 IFQW$="1"THEN550ELSEIFQW$="2
"THEN555ELSEIFQW$="3"THEN560ELSE
IFQW$="4"THEN565
545 GOTO535
550 QW=1:RETURN
555 QW=2:RETURN
560 QW=3:RETURN
565 QW=4:RETURN
570 FORI=1TO600:NEXT:RETURN
```

SUPPORT:

(sə·pôrt) v.t. **1**. To bear the weight of, especially from underneath; uphold in position; keep from failing, etc. **2**. To bear or sustain (weight; etc.) **3**. To keep from failing; strengthen: *PBJ, Inc. supports their product line with technical personnel that are always there to help you.* **4**. To serve, to uphold or corroborate (a statement, theory, etc.) substantiate; verify: *PBJ, Inc. receives testimonials on a daily basis that support their product line.* **5**. To provide (a person, institution) with maintenance; provide for: *PBJ, Inc. supports the CoCo user by consistently creating new advancements in their field.*

Synonym: **PBJ, Inc.**

A long description indeed, yet very applicable to the kind of service delivered by PBJ, Inc. When the serious CoCo user needs back-up support, technical information or assistance, PBJ, Inc. is there! From the products they manufacture through to the strategic solutions they offer, PBJ, Inc. has rightfully gained the reputation of "the company with *the most support* for the Color Computer."

pbj inc.

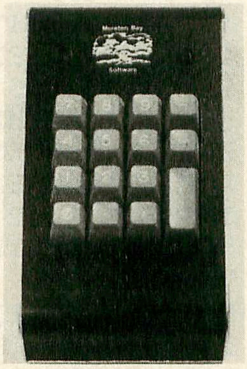
"Innovative Products for the CoCo User"

Call or write today for our **FREE** Catalog . . .
P.O. Box 813 • North Bergen, N.J. 07047 • **201-330-1898**

* Derived from *Funk & Wagnall's International Dictionary*

MORETON BAY

MORE KEYS

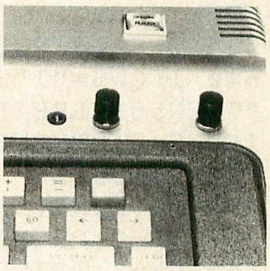


At last a quality numeric keypad for your Color Computer. This 15 key numeric pad plugs inside your computer and gives you the convenience of rapid numeric data entry. Dimensions: length 6½" (165mm), width 4" (101 mm), height 3" (76 mm). Baked black enamel finish. Specify computer model. MORE KEYS complete with cable and connector.

$69.95

RESET-POWER-SWITCHES

A REAL IMPROVEMENT

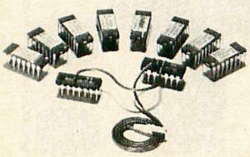


Move the power switch and reset switch where they belong. An LED power on light too! High quality parts, D and E boards and CoCo2 totally solderless kit. F board requires soldering.

Reset 1 Coco 1 $24.95
Reset 2 CoCo 2 $27.95

Either kit add $2.00 shipping and handling.

64K UPGRADES



Instantly access 64K via M/L totally solderless kit to upgrade E Boards. Kit includes eight 4164 prime chips and chips U29 and U11 already soldered. SPECIAL: E Board Kit $39.95, F Board and Color Computer 2 $26.95.

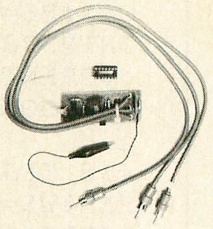
Guaranteed Pretested

FILE CABINET

Data base, alphabetizes, sorts numeric entries, searches for key words or numbers, computes totals & averages by categories, saves records, changes or deletes them. Up to 20 entries for each record, up to 256 characters for each entry. Mailing list included. Output to screen, printer or tape. Print all or selected records, +, −, ×, ÷ Numeric entries.

16K EXB Cassette $29.95

DOUBLE DRIVER



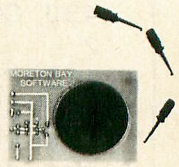
The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.

MONO II

Mono II for Color Computer 2. An excellent monochrome monitor driver that has audio output also. Specify model needed.

$24.95.

MINI MOUTH



Add sound to your mute monitor. Hear the bells and whistles of your software again. No batteries. Solderless installation.

All Color Computer Models
$24.95

THE COCO-SWITCHER

A QUALITY PIECE OF HARDWARE

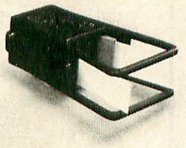
COCO SWITCHER

The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance, The LED flickers when transmitting or receiving data.

Dimensions: 2½" (64mm) x 4" (102 mm) x 5 7/8 (150 mm)

$39.95 plus $2.00 shipping and handling

PIEZO FAN



Two counter-oscillating mylar blades are driven at resonance by two piezo ceramic elements. No wearing parts. No RFI and no EMI. Consumes 0.11 watt at 120 VAC. Moves 5 cubic feet of air per minute. Mounts inside your CoCo. 3.2 cm. x 5.1 cm. x 8.4 cm. **Please** specify computer model number.

$29.95

USE YOUR COLOR COMPUTER TO ORGANIZE YOUR BUSINESS

MORE BUSINESS

Version 3.2. The preferred business accounting package. A completely interactive system which features a general ledger you can customize for your own business. More than 900 accounts can be added. The accounts receivable routine will print invoices, record cash sales and automatically post to the general ledger. More than 400 customer balances can be maintained and automatically aged. Print customer statements and mailing labels. Profit and loss and balance statements printed at any time. Complete audit trails. Our most powerful business package. Buy the best!

32K Disk R/S DOS $99.95

MORE INVENTORY

Maintain an inventory of over 1000 units. Total inventory value computed with a single key stroke. Print lists of stock on hand, stock on order and stock to be ordered. Can also be used by hobbyists and collectors. Now you can organize your collection in a professional manner.

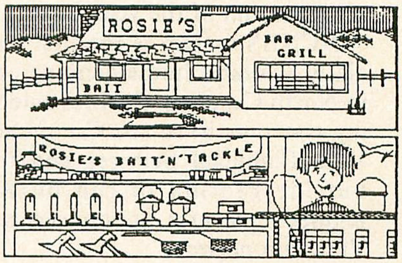
32K Disk R/S DOS $44.95

Having trouble with your CoCo? We have the chips you need. Call us. (805) 962-3127

SOFTWARE

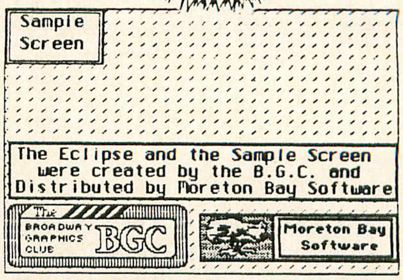
NEW!

THE VERY BEST IN GRAPHICS


ROSIE'S
BAR
GRILL
BAIT
ROSIE'S BAIT'N'TACKLE

ECLIPSE

Allows you to "Zoom" in on the pixels of your graphics. Precision editing for your graphic creations. With ECLIPSE you can refine detailed graphics in high resolution pictures. Design game characters. Edit fonts. Easy to use. Bonus: extra graphic screens included Requires 32K, disk $19.95

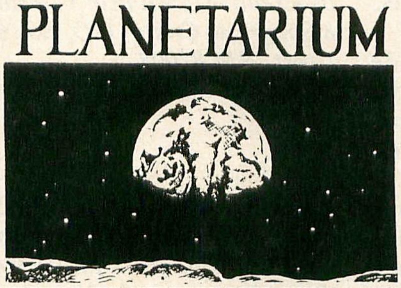

Sample Screen

The Eclipse and the Sample Screen were created by the B.G.C. and Distributed by Moreton Bay Software
The BROADWAY GRAPHICS CLUB
BGC
Moreton Bay Software

SAM DIAMOND, P.I.

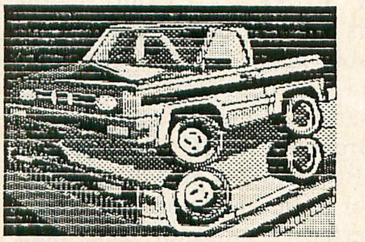
The first of our new Sam Diamond graphic adventures. More than 40 detailed high resolution graphic scenes. A killer is loose in the city. Can you bring him to justice before he gets you? Excellent graphics and a tough mystery to solve.

32K Disk Only $29.95
plus $2.00 shipping and handling


PLANETARIUM

PLANETARIUM

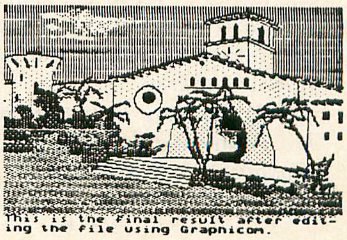
A five program celestial package. A star gazer's aid. A program to familiarize you with the appearance of the major constellations. 21 first magnitude stars. Moon phases. Day or night sky. Any latitude. 33 constellations. Charts planet locations from A.D. 0 to the year 10,000. Requires 16K Extended Basic. $19.95



GET THE MOST FROM YOUR GRAPHIC PROGRAMS

How to integrate Graphicom and CoCoMax. Two tutorial disks full of examples and suggestions. See how to create graphics step by step. Learn how to display and even animate your graphics from Basic.

1 Disk $14.95
2 Disks $24.95


This is the final result after editing the file using Graphicom.

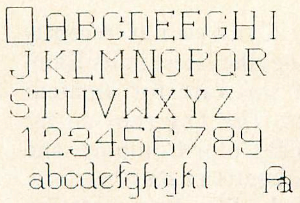
GRAPHICOM

Buy Graphicom from us and get one of our unique picture disks free! Get our improved Picture Disk One also. The first in the new generation of graphic utilities. An excellent utility. Requires: 64K EXB, Disk Drive and Joy Sticks. Three disks and the best bound documentation for only $29.95.

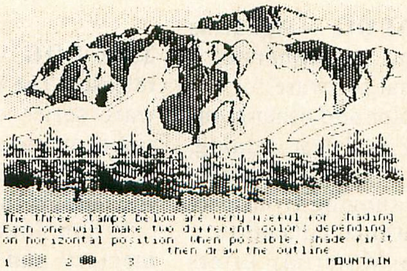
Calligraphy STAMP DISK: Useful letters and designs for making your own signs and menu screens.

Adventure Disk 1: Indoor scenes and objects. Helps you draw pictures and learn more about Graphicom.

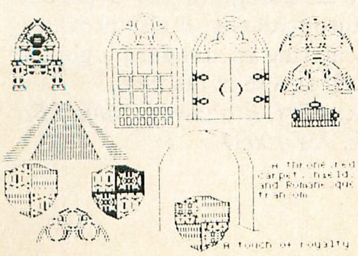
Adventure Disk II: Outdoor scenes and objects. A graphicom tutorial as well as a useful library of images you can use.


ABCDEFGHI
JKLMNOPQR
STUVWXYZ
123456789
abcdefghijkl

Calligraphy Disk II: 23 New letter stamp sets.


The three stamps below are very useful for shading
Each one will make two different colors depending
on horizontal position. When possible, shade first
then draw the outline
1
2
3
MOUNTAIN

⇧
Adventure Disk II


A throne red carpet, fields, and Romantic Gothic
A touch of royalty

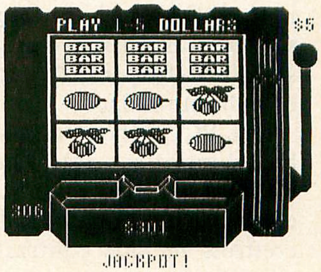
◁ Adventure Disk 1

1 Picture Disk $15.95
2 Picture Disks $24.95
3 Picture Disks $29.95
4 Picture Disks $34.95

HOTSLOT

Own the hottest slots on the block! Run your own casino with 6 different slot machines. Control the payout Bet $1.00 to $5.00. Choose double and triple jackpots. Gamble to your heart's content. Play casino odds, moderate odds or get rich quick. Play a game of skill - SLAMSHOT! - try to stop the reels yourself.

32K EXB, Joystick optional
$24.95 Specify Disk or Tape


PLAY 1-5 DOLLARS
$5
BAR
BAR
BAR
306
$300
JACKPOT!

MORETON BAY SOFTWARE

A Division of Moreton Bay laboratory

316 CASTILLO STREET
SANTA BARBARA
CALIFORNIA 93101
(805) 962-3127

VISA MasterCard

Ordering information

Send $2.00 shipping and handling per order. We ship within 1 working day on receipt of order. Blue Label Service available. California residents add 6% sales tax.

PIPELINE

VIDEO TECH — The IIA 17th Annual Convention and Exhibition, which will run Nov. 3 - 6, will feature a thorough examination of videotex developments, both in the U.S. and internationally.

The convention will also include videotex panel sessions, which were developed by Laurence Fuller, president of Gannett New Media Services. Some topics that will be highlighted at the convention are: what's new in home and office interactive videotex; progress in public access videotex; a look back and ahead at videotex; niche markets in videotext; new developments in teletex; and opportunities in the international videotex market.

Information Industry Association, 316 Pennsylvania Ave. S. E., Suite 400, Washington, D.C. 20003.

* * *

PCC FROM P.R.O. — P.R.O. Systems of Kansas City has taken the Tandy Color Computer 2 and created a completely portable version. The PCC is compatible with all Color Computer software because no changes were made in the ROMs or hardware. The processor card is custom-designed, but all standard functions, addresses, etc., have been retained.

The PCC is housed in a heavy, durable aluminum case. The detachable keyboard serves as the front cover and comes with a 24-inch cord. Front panel controls include contrast, brightness, color level and tint.

The PCC comes with 64K memory, Disk Extended BASIC operating system, full schematics and documentation, and a 90-day warranty.

P.R.O. Systems of Kansas City, 10601 West 63rd St., Shawnee, KS 66203.

* * *

DISK, TOO — Creative Technical Consultants, which has specialized in cassette-based educational programs for the Color Computer, has announced that all of its educational software is now also available on disk.

Free catalogs are available by writing to *Creative Technical Consultants, 16-8 Sangre de Cristo, P.O. Box 652, Cedar Crest, NM 87008.*

* * *

PHOTOFARE — PhotoSource International now offers three publications — *PhotoBulletin, PhotoMarket* and *PhotoLetter* — on NewsNet, the nation's largest distributor of specialized business newsletter information.

PhotoBulletin is designed to save photographers research time through NewsNet's electronic clipping service. *PhotoMarket* is intended for part-time professional photographers or serious amateurs. Published twice a month, the service focuses on buyers who pay mid-range prices.

PhotoLetter is recommended reading for entry-level photographers. There are also marketing tips, pricing methods and other information for more experienced photographers. All listings include photo editors' needs, prices and contact information.

NewsNet, 945 Haverford Road, Bryn Mawr, PA 19010.

* * *

SOFTWARE CATALOG — Aquarius People Materials, Inc., publishers of a full line of educational software for the Tandy Color Computer and other computers, has released its latest catalog. The catalog includes over 200 programs in curriculum areas ranging from preschool through vocational education.

Aquarius People Materials offers networking versions, licensing agreements and volume discounts on bulk orders. For your free catalog or more information, write to *Aquarius People Materials, Inc., P.O. Box 128, Indian Rocks Beach, FL 33535.*

* * *

HOME BANKING — North Carolina National Bank has launched a home banking program that offers personal computer owners free use of the service until the end of the year.

NCNB's system is the first commercially available home banking program in North Carolina, the first video banking system to be run on CompuServe by VideoFinancial Services and the first outside Florida to run on Knight-Ridder's recently announced national Viewtron network.

The bank's program operates in ASCII on CompuServe with almost any personal computer and on Viewtron with some Commodore and Apple models, the IBM PC and its compatibles.

* * *

TANDY TUNES — Tandy Color Compters can now be turned into programmable music synthesizers with Orchestra-90 CC, a unique combination of hardware and software.

The Orchestra-90 CC cartridge slips into the Program Pak port of the Color Computer or into one port of a Multi-Pak Interface. Connector jacks built into the Orchestra-90 CC cartridge connect the Color Computer to a stereo system to produce a stereo synthesizer.

Files may be transmitted through an optional 300 Baud modem, and a built-in communications package permits communication with online services.

Tandy Corporation/Radio Shack, 1700 One Tandy Center, Fort Worth, TX 76102.

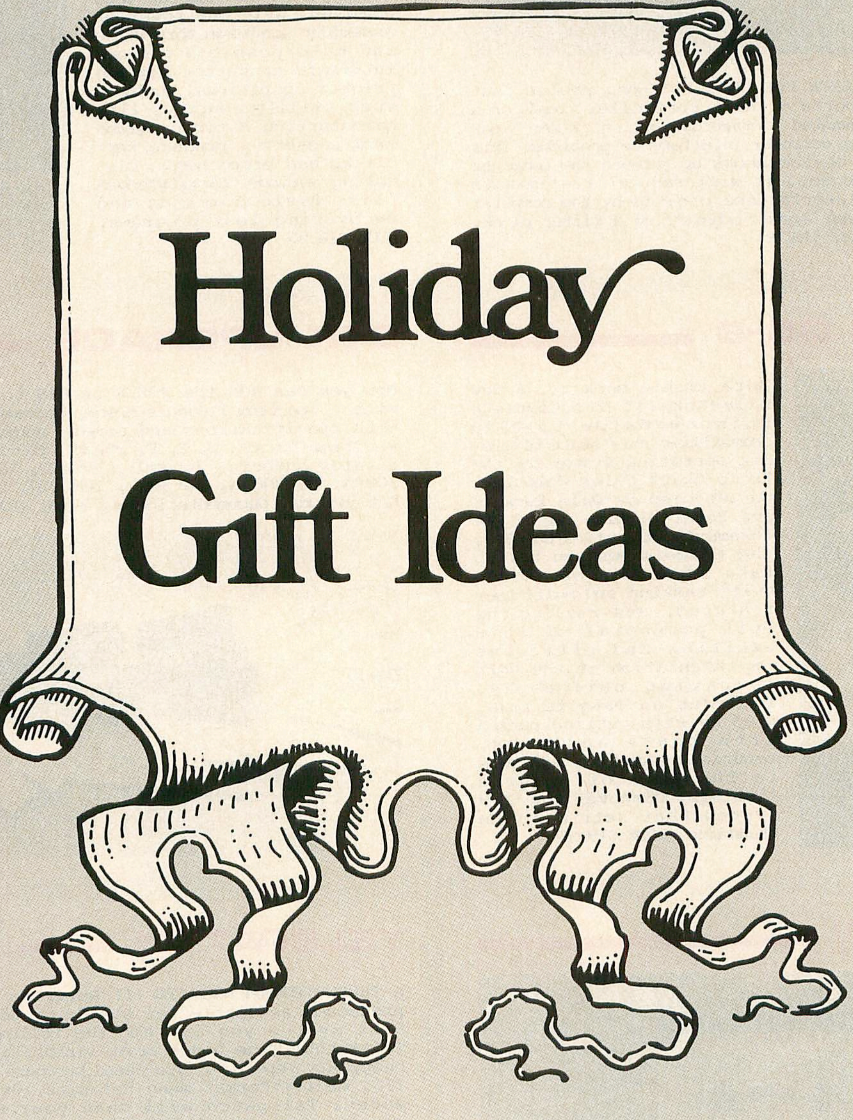
* * *

THE LOG — Cynwyn has recently released *The Log*, the latest in its Hamware series of software for amateur radio operators. *The Log* runs on the 16K or 32K ECB Color Computer and is available in cassette or disk versions.

When loaded, *The Log* tests for memory and configures itself to take maximum advantage of the available memory automatically. It also provides fields for entering all standard logbook data, as well as a remarks field.

Cynwyn, 4791 Broadway, Suite 2F, New York, NY 10034.

Season's Greetings



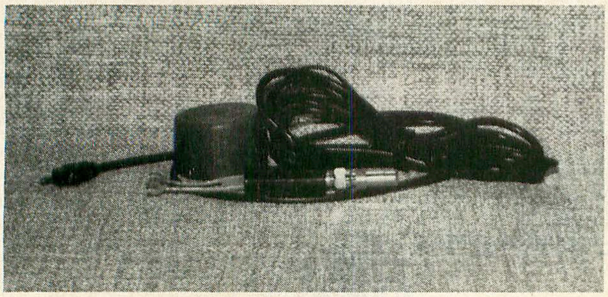
Holiday Gift Ideas

FROM

SPECTRUM PROJECTS INC.

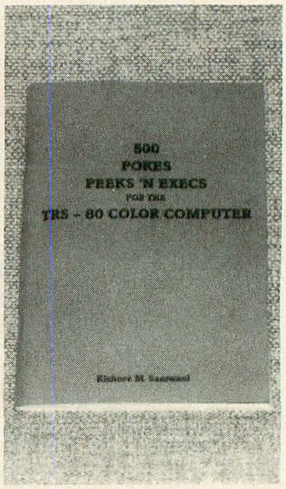
SPECTRUM PROJECTS

VIDEO CLEAR



CLEANUP TV INTERFERENCE FOR GOOD !!! Long cables that connect to the I/O ports or disk controller cards on a computer can cause unwanted picture distortion. Video Clear is the answer to your computer interference problems. This simple, inexpensive device hooks up between the computer and your television set. It will reduce or eliminate completely picture interference created by the computer itself. The Video Clear system consists of a filter block, 300 ohm BALUN and cable. $19.95

500 POKES & PEEKS



500 Pokes Peeks 'n Execs for the Radio Shack Color Computer by Kishore M. Santwani is a unique book inasmuch as it contains technical data which is of utmost significance to any programmer. It includes 80 pages of information on many POKE, PEEK and EXEC commands with full explanations and comments on the use of each command. Gain the power of Assembly Language thru Basic and make possible various intricate cassette, disk and printer operations. Includes such utility routines like Autostarting Basic programs from cassette, produce key-clicks and error-beeps, disabling various Color/Extended /Disk Basic commands and recovering lost programs. BOOK $16.95

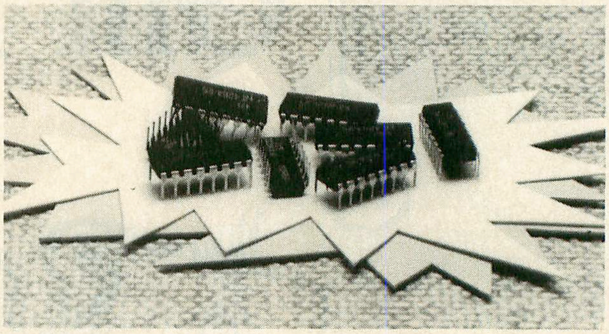
GUIDE TO OS-9

THE COMPLETE RAINBOW GUIDE TO
OS-9
By Dale L. Puckett
and Peter Dibble

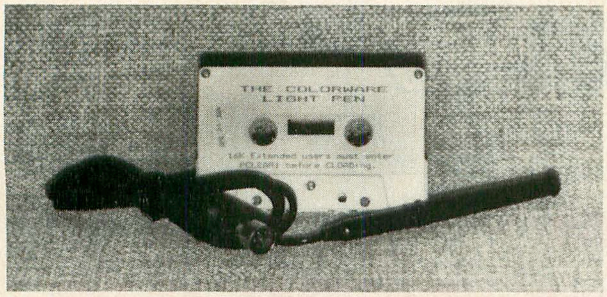
More than a book.... A new milestone!!! The Complete Rainbow Guide to OS-9 demystifies this state-of-the-art operating system for the Radio Shack Color Computer. Co-authored by Dale Puckett and Peter Dibble, two of the foremost authorities on OS-9, the Guide shows you how to take advantage of OS-9's multi-tasking and multi-user features, and realize the full potential of this exciting and efficient implementation of the UNIX operating philosophy. Includes an easy to read, step by step outline packed with hints and tips, tutorials and free software in the form of program listings. Discover the OS-9 system that sets new CoCo standards. BOOK $19.95

64K UPGRADE

Now you can add the POWER of 64K to your Color Computer with a Spectrum Projects Memory Upgrade Kit! Comes complete with specifications and memory upgrade instructions for Revision Boards: D, E, F, NC, ET, TDP-100 and CoCo II. Fits catalog numbers: 26-3001, 26-3002, 26-3003, 26-3002A, 26-3003A, 26-3004A, 26-3026, 26-3027, 26-3134, and 26-3136. Kit includes documentation and eight (8) 64K chips. $19.95



LIGHT PEN



The CoCo Light Pen plugs directly into your joystick port and comes with six fun and useful programs on tape. All six programs are contained within a single master menu program and can be easily selected by just holding the CoCo Light Pen up to one of the six flashing boxes. These programs demonstrate coding techniques and represent a sampling of some of the things that can be done with the Light Pen and a little Basic programming. The package includes such programs as Concentration and Hangman. 16K TAPE $19.95

TELEPATCH

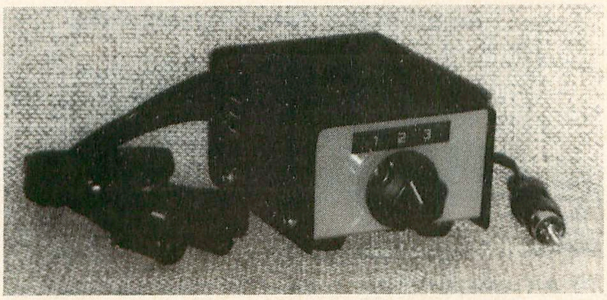
A TELEWRITER-64 ENHANCER !!! Telewriter-64 is the best word processor available for the Color Computer. Using a 64K Disk system you can add the following features with Telepatch: True block move, visable carriage returns, key beep, key repeat, a type-ahead keyboard buffer, FASTER Disk I/O, modify Format menu defaults, Overstrike and TSPOOL modes. Telepatch will make your favorite CoCo word processor more useful and productive NOW! 64K DISK $19.95

TELEPATCH
TELEWRITER
ENHANCER
VERSION 2.1

ORDERING INFORMATION ON PAGE 107

HOLIDAY GIFT GUIDE

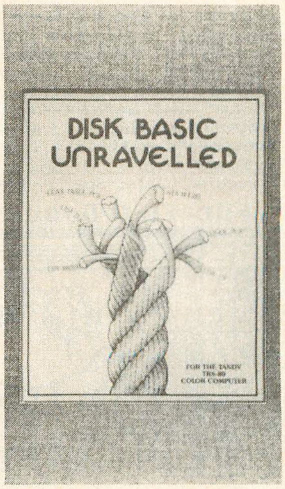
TRIPLE SWITCHER



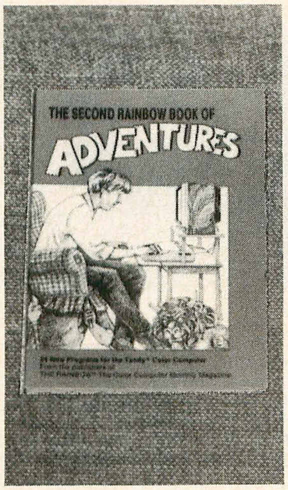
One of the major bonuses of the Color Computer is the inclusion (at no extra cost) of an RS-232 interface for hooking up printers, modems, etc. as a standard computer component. However, most CoCo users run into the dilemma of always having to plug and unplug cables from the back of their CoCo to choose which RS-232 peripheral they want "on line". The Solution??? A Spectrum Projects Triple RS-232 Switcher! Now, select one of any three (3) RS-232 peripherals without cable swapping by merely turning a knob! $39.95

UNRAVELLED SET

The complete disassembly of Color, Extended and Disk Basic ROMS is here! These books are an indispensable tool for the programmer who seeks a full, in-depth knowledge of Basic. All of the innermost operating processes are exposed. Contains a Memory Map with no missing spaces, everything is defined! Easy to understand and covers ALL ROM versions. A fully commented source listing of Color, Extended and Disk Basic is provided. The Basic UNRAVELLED SERIES will make it easy for you to write your own Basic commands or modify existing ones for whatever purpose you desire. Complete three (3) Book Set $49.95



ADVENTURES



Twenty-four of the most challenging Adventure games ever compiled await you in the Second Rainbow Book and Tape of Adventures. Blast through time; fight World War III; win the heart of a mysterious and beautiful princess. Experience the chilling thrills of rugged Adventures without ever leaving your seat !!! Order the Second Rainbow Book of Adventures and experience: Time Tripper, The Riddle of Randomar, Yellow Submarine, Crypt of Flodnar, plus many more. The Second Rainbow Adventures' Tape is a necessary complement to the Book and will save hours of typing! The Tape also contains a special BONUS of three (3) additional super Adventures !! BOOK & TAPE $29.95

OS-9 SOLUTION

THE OS-9 SOLUTION

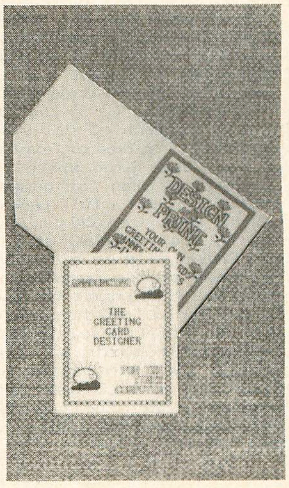
Finally a program that creates a "USER FRIENDLY" environment within OS-9! The OS-9 Solution replaces 19 of the old "USER HOSTILE" commands with single keystroke, menu driven commands. No more typing in complex, long pathnames or remembering complicated formats! The OS-9 Solution does multiple copying, killing and info printouts for whole or partial directories. Sets all XMODE parameters at the touch of keys! Uses separate source and destination directories for "single key" copies. All files are contained in a directory "WINDOW", allowing the use of the up and down arrow keys for instant access & execution of all command functions. Requires OS-9 Ver 01.01.00 $39.95

MINI MODEM

Join the hottest CoCo Comunity Electronic Information Service (DELPHI) with the lowest cost CoCo modem on the market today - The Mura 300 Baud MINI MODEM! The MINI MODEM is a self-contained telephone interface that has full duplex operation, direct connection, standard RS-232 connector, carrier detect indication and selectable originate/answer mode. Setting a new standard for quality, reliability and value! Requires CoCo modem cable ($14.95) Mini-Modem $39.95

CARD DESIGNER

It's here just in time! The FIRST, stand alone, Greeting Card Designer for the Color Computer. Create custom greetings for any occasion: Birthdays, Anniversaries, Mothers' Day, Valentines, Christmas and others. The program can be used to make custom Thank-You, Invitations, Get-Well cards and Announcements! The CoCo Greeting Card Designer is easy to use and includes a library of pre-drawn Hi-Res graphic pictures for most holidays (a Christmas Tree, Birthday Cake, Turkey, Gift Box and others). You can also design your own graphic images to create just about any theme greeting card! Also includes eight (8) decorative borders, screen editor, font editor & more! 32K DISK $24.95

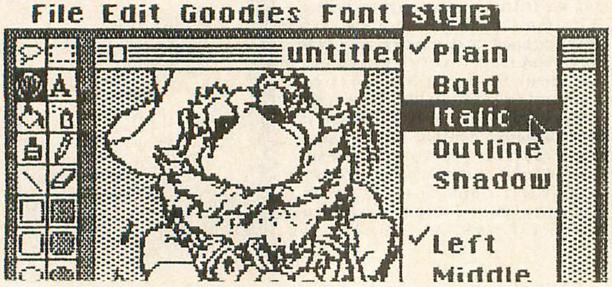


SEE PAGE 107 FOR GIFT CERTIFICATE DETAILS

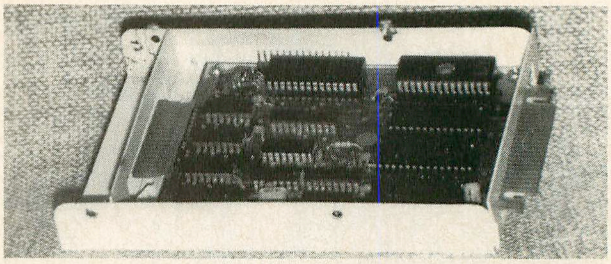
SPECTRUM PROJECTS

COCO MAX

Feature packed hardware and software Graphics System! Includes: Pull-Down Menus, Icon processing, multiple Fontstyles, full graphic editing, a special Input Module for 256X192 joystick input, thirty-two (32) paint brush shapes, eight (8) different screen dump formats, Fat Bits "Zoom" and more! CoCo Max is the most exciting Color Computer product of the year and without a doubt on top of everyone's gift list for the Holidays! Requires 64K. Disk Systems require a Multi-Pak Interface or ($29.95) "Y" Branching Cable. Specify 64K TAPE or DISK $69.95

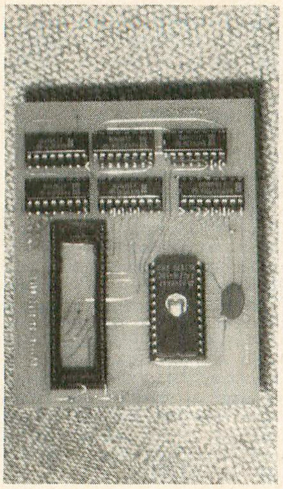


SUPER CONTROLLER



The most AMAZING Color Computer Disk Controller ever! The Super Controller allows you to switch up to four (4) different DOSs (up to 16K each) via a single software POKE (POKE 65345,X). Now you can choose between Radio Shack DOS 1.0/1.1, Spectrum DOS, JDOS, ADOS, Stearman DOS, etc.. Compatible with 27128 or 2764 EPROMs. Gold contacts on all connectors, shielded metal box for low RF noise. Works with both CoCo I and CoCo II. Internal mini-expansion bus available for a Real Time Clock, EPROM Programmer, Parallel Printer, etc.. If ordered with the Super Controller, RS DOS available for $19.95. The Super Controller $99.95

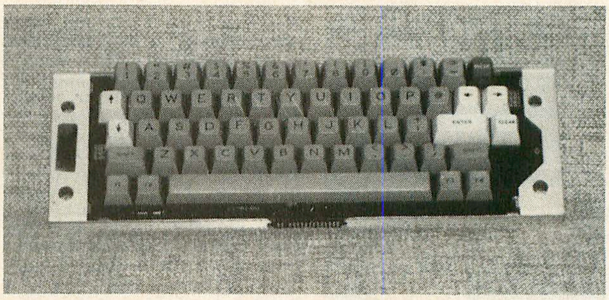
THUNDER RAM



The first 256K Memory Board for the Color Computer ever! Load four 32K programs at once, emulate a 40 track RAM-DISK (great for Databases and Mailing List programs), 60K Print Spooler, FAST access, 30+ Hi-Res screens in memory at once (super for Graphics). Easy installation, software and tech information. NOT available for CoCo IIs. OS-9 Ramdisk Driver $24.95 (a MUST for compiling under C) $99.95

256K
256K
256K

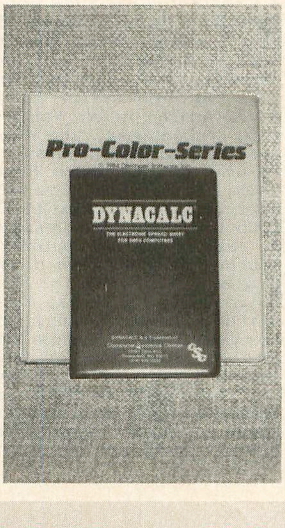
HJL-57 KEYBOARD



Unlock the full potential of your Color Computer with the ergonomically superior HJL-57 Professional Keyboard. The HJL-57 has sculptured, low profile keycaps and full-travel bounce-proof key switches to help sail through lengthy listings with maximum speed and minimum errors! Now you can do real word processing with the LAST keyboard your CoCo will ever need. And as an extra bonus, the HJL-57 has four (4) user definable function keys with free software provided. Specify CoCo Model and Revision Board. $69.95

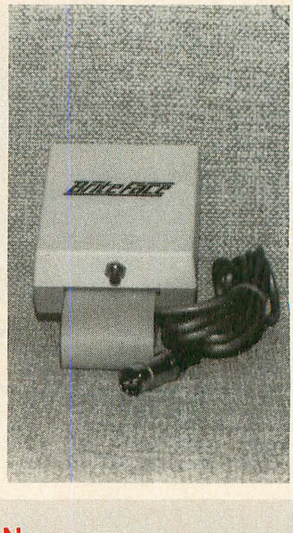
PCF/DYNACALC

The Dynamic Duo for number crunching and information retrieval. Dynacalc is an electronic spread-sheet with its own built in operating system that provides up to 256 rows by 256 columns of cells for numbers, strings or expressions. Uses high speed 16-digit precision for numeric operations and a full package of Hi-Res Graphics (pie charts, bar graphs, etc..). Pro Color File is a flexible database system comprised of routines that permit the user to design his own information storage & retrieval program to enter records on disk, search the information for updating and to generate screen or printed reports. Holiday Special- Both for only $99.95



BRITEFACE

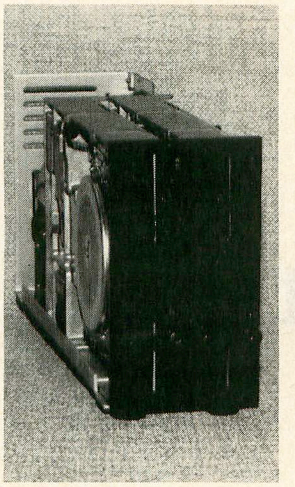
The first INTELLIGENT serial-to-parallel printer interface for the Radio Shack Color Computer or MC-10. This small compact unit creates a parallel printer port suitable for most Centronics compatible printers (Epson, Gemini, Okidata, C-Itoh, Radio Shack, etc...). BriteFace samples incoming data and instantly computes the correct Baud rates for maximum efficiency and correct printer operation! Eliminates any and all guesswork or switches to turn. Compatible with transmission rates from 600 to 9600 Baud. $59.95



SEE PAGE 107 FOR ORDERING INFORMATION

HOLIDAY GIFT GUIDE

DISK DRIVE 0



Upgrade your Color Computer by adding a 5 1/4" floppy Disk Drive 0. All disk components are 40 tracks, single sided, double density, FAST (6ms) stepping rates and quality half-height drives. The systems include heavy duty power supply and case, filler plate, drive cable, manual and the Super Controller w/RS DOS 1.1. The Super Controller is state of the art with gold plated connectors and can switch up to 4 different DOSs via a single software POKE! And if they have been really good - Give them (or yourself) the works! A combination Disk Drive 0 & 1 System for only $319.95. Also available are add on drive units 1, 2 or 3 for $119.95. The complete Drive 0 System $199.95

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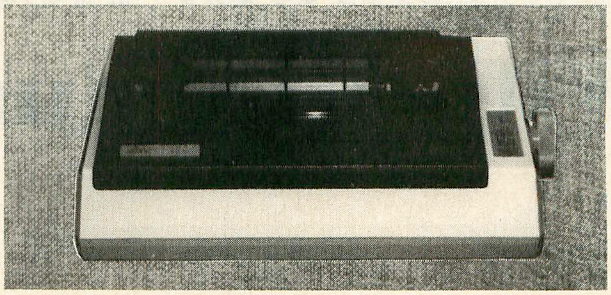
There are lots of printers on the market from which to choose but the Gemini SG-10 shines above them all! Look at all these features: Lightning speed of 120 cps, outstanding Near Letter Quality (NLQ) print mode, tractor and friction feed, a 2K buffer, self test, bi-directional and logic seeking movement, 9-pin printhead and 96 standard, italic or NLQ ASCII characters. Requires Brite Face interface for CoCo ($59.95). Find out why the Gemini SG-10 is the power behind the printed word. $239.95



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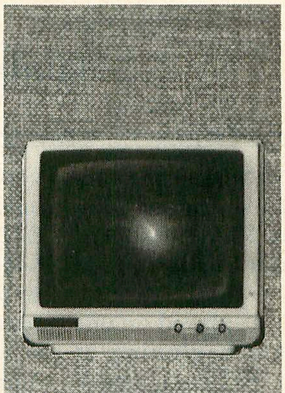
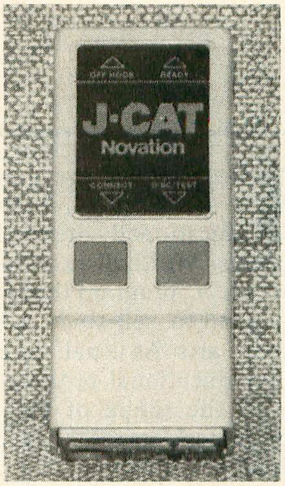
The right monitor at the right price! The Spectrum Projects Amber Monitor delivers the compatibility, resolution and reliability you need for any application form Word Processing to sophisticated Business Graphics. Our Amber monitor is a 12" Hi-Res (80x24 screen) unit with anti-reflecting tube and Video Bandwidth of 20mhz. And, as an extra bonus, it has the audio amplifier included. No need for additional hardware or go without sound! Requires the Universal Video Driver ($29.95) which works with ALL monitors and CoCos! Dimensions (W12" x D11" x H11") $119.95



J-CAT MODEM

The Novation J-Cat is the smallest, most versatile modem for Color Computer users on the market today! The J-Cat has big features in a very small package (5" x 2" x 1.3") Auto/answer, self-test diagnostics, LED indicators, audio beeper, automatic originate/answer mode selection, break key and more! The J-Cat is the perfect modem for running a CoCo BBS (Colorama, $99.95, is the matching Bulletin Board software program for it)! The J-Cat comes complete with interfacing cable. Direct connect and 300 baud. $119.95



64K COCO II

The perfect gift at the perfect price! Take advantage of Spectrum Projects' special holiday savings on a 64K Extended Basic Color Computer II. Includes the latest CoCo II keyboard with raised key caps instead of the old "chiclet" style! The 64K CoCo II has enough power and performance for advanced home and small business applications. Guaranteed the LOWEST price in the Rainbow magazine, period!!! $129.95

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A once-in-a-lifetime deal as the ULTIMATE Holiday special!! Create an instant library of Spectrum Projects TOP Colorful Utility software. Select any 12 programs to customize your own spectacular software bonanza! CoCo Checker, Multi-Pak Crak, CoCo Screen Dump, Disk Utility 2.1, Spectrum Font Generator, Spectrum DOS, Schematic Drafting Processor, Fast Dupe II, 64K Disk Utility Package, Tape/Disk Utility, Fast Tape, Graphicom, EZ Base, OS-9 Solution or Basic+ (a $300 plus value) for only $119.95

EXPRESS PHONE ORDERS SEE PAGE 107

Maximum Learning With Minimum Effort

By Joseph Kolar
Rainbow Contributing Editor

BASIC allows the newcomer to create practical, interesting and educationally oriented computer programs. We shall examine a simple Color BASIC program that is ideal, but not limited to, self-study in the foreign language arts. As usual, the application of any educational program is limited only to the scope of the beginning programmer's imagination and inventiveness.

The heart of this program is remarkably short and simple. This "core" can be `CSAVE`d and `CLOAD`ed whenever the desire strikes you to create a program you deem suitable for self-study. It can be geared to your students'/children's school work, or just to see what can be created. The object is to create a text sentence on the screen, then add the translation.

And so to work! `CLOAD` Listing 1. (You may want to `CSAVE` it first, giving it a name such as "langcore" or "core.") It is very short but serves the purpose of formatting the text without much sweat. The text is displayed on a background of one of the eight colors available in Color BASIC, which are randomly chosen in Line 5 by `Z=RND(8)`. The color is called in a `GOSUB` routine in Line 2000.

The first sentence is displayed on one or more rows of text beginning at `PRINT@X,"` located at 96 (Line 5, `X=96`). This is the left end of the fourth line from the top on the text screen.

The first panel presents a French sentence, without accent marks, at program Line 10. `EDIT10` and press 'X' to get to the end of the line. Space twice to allow for a two-space indentation. Key in the sentence: "C'est une idee excellente." Add appropriate punctuation marks. Space twice to allow for a blank trailing area so the last word stands out clearly; add the closing quotation mark. If you don't want the line to extend to the end of the row at the right side of the screen, and we don't, add a semi-colon (;). Add a colon (:) to separate the French text line from the next statement to create multiple-line statements. The purpose is to create each panel using one program line.

We will pause until any key is pressed by using `EXEC44539`, which is taken from Line 3000 by typing `GOSUB3000`. Instead of keying `GOSUB3000`, you could type `EXEC44539`. Bitter experience indicates that repeatedly keying in `EXEC44539` leads to errors, such as 44439, 45439 and so forth. Both of these wrong numbers will hang up the CoCo, requiring `RESET` to put things right. It is possible that some wrong number can damage the program beyond salvaging. If you had completed about 20 panels, tears of frustration are apt to well in your eyes.

Thus, it is safer to place the `EXEC44539` into a subroutine and call it with `GOSUB3000`, which, if incorrectly entered, can be easily rectified without panic.

`RUN` the listing and check the sentence for correct spelling and punctuation. Check for two blank spaces at both the beginning and ending of the sentence. The background should be Color 8, orange, on the first panel. This was deliberately set in order to guarantee a contrasting background color to check the ribbon of text. Press any key (ENTER will do just fine) and a flicker will run through the ribbon of text. Now press BREAK and type `LIST`.

Note at this time that Line 6 creates an orange background followed by instructions to go to Line 10. More about this important line later.

(Florida-based Joseph Kolar is a veteran writer and programmer and specializes in introducing beginners to the powers of CoCo.)

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	Competition	DYNACALC
Screen	32X16	51X24
Precision	9 digits	16 digits
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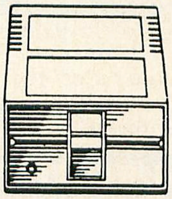

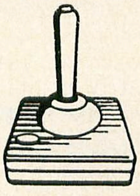

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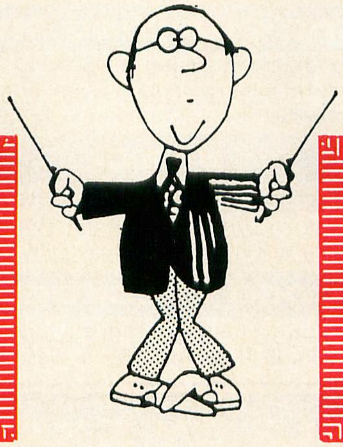

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NEW!

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Type `EDIT10` and press 'X' to get to the end of the line. Add `:PRINT@Y,"` and space twice. Key in the English translation: "That is an excellent idea" and space twice. Add the closing quotation mark and semi-colon and colon to stop the green ribbon from extending to the right end, and to prepare to add another multiple statement.

Now, key in `GOSUB2000`. It picks a random color and waits for a key to be pressed so CoCo can set up a random color background for the next panel.

Type `RUN` and press ENTER once for the French sentence, then ENTER a second time to produce the translation. Check your work and correct as necessary. (Press ENTER or any other key.) You will get a new screen with the French sentence. Press BREAK and type `LIST`. Since there are no other sentences, the next instruction after Line 10 is Line 1000, which tells the CoCo to go back to Line 10 and repeat. We will maintain an increment of 10 for our program lines.

Type `EDIT6` and press 'X' to go to the end of the line. Press the left arrow twice to erase 10, then key in 20 and ENTER. Or, `EDIT6` and space over so the cursor is under '1'. Press 'C' and '2', then ENTER.

As soon as you finish this change, begin creating the new program line: `20 PRINT@X,"`. Using the same technique you used to create Line 10, type in the Italian sentence, "Spenga le luci, per favore," making sure you have two leading and trailing spaces at each end. Add `";:GOSUB3000` and `RUN`. Check out your work!

Press ENTER a few times. Note that after the initial cycle, the color of Line 20 is randomly chosen. Line 2000 took care of that chore. That is why Line 20 on doesn't require a `CLS(Z)`. Line 10 will always be on an orange background, unless you care to go back at this stage and change `CLS(8)` to `CLS(Z)`. Of course, you could `EDIT10` press '7', 'D' and ENTER, and get the same result.

Press BREAK and type `EDIT20`; press 'X' to go to the end of the line. Now, type `:PRINT@Y,"`, space twice and type in PLEASE TURN OFF THE LIGHTS. Space twice at the end of the line and type `";:GOSUB2000` and ENTER.

Type `RUN` and press ENTER twice. Check your work! Press BREAK, type `EDIT6` and change 20 to 30 and ENTER. Start the next line; type `30 PRINT@X,"` and space twice. Key in "Haben sie verstanden was Ich gesagt habe?" and finish up as usual: space twice and type in `";:GOSUB3000`.

Now run the program and if you keyed in this German sentence correctly, you will note that it requires two rows to display it. You will also note that GESAGT is split on both lines. You can readily see that it is simple to move 'G' to the next line by inserting a space in front of it. Press BREAK, type `EDIT30`, press 'I' (for insert), space, press ENTER and `RUN`. When you check it, it should be correct. Press BREAK, type `EDIT30`, press 'X' to go to the end of the line and type `:PRINT@Y,"` then space twice. Add the English translation: "Did you understand what I was saying?" Finish up, add the `GOSUB` and `RUN`.

Even though this translation required two program lines, no words split between rows. You win some and lose some!

On your own, edit Line 6 and create the next panel. Key in the Portuguese sentence: "Terei que aumentar o meu vocabulario." `RUN` when you are ready. You will find that VOCABULARIO is split between two lines. It is better when keying in foreign words to avoid hyphenation, which can be confusing to the student.

Studying the text display, we note that we can move "VOCAB" down to the next row by inserting five blanks in front of 'V'. Type `EDIT40` and space over until the cursor is under the 'V'. Press 'I' and space five times, then press ENTER and run to check it out. Next, press BREAK and add the translation in its proper format: "I will have to increase my vocabulary." When finished, run the program again. "VOC" is on one line and "ABULARY" is on the following line. The first syllable is "VO." We can insert a hyphen (-) in front of 'C' and push it to the next line. To do this, press BREAK, type `EDIT40` and space over until cursor is under the 'C'. Press 'I', put in the hyphen, press ENTER and run.

This is OK. If you prefer, go ahead and edit Line 40 to push the "VO-" to the next line. See which you prefer. Type `EDIT40` and space over until cursor is under 'V'. Press 'I' and space three times, press the SHIFT and up-arrow keys together and space twice, press 'D' to delete the hyphen, then ENTER and run.

Change Line 6 to 50, and use the same format type in the Spanish sentence, "Por favor, traigame otra taza de te con dos rodajas de limon."

Run the program. You notice that there is only one orange spot at the end of the sentence. It would look better if it was green. Make this change on your own so the entire line is green.

The word "rodajas" is unfamiliar to me and I gather from the context that it means "slices." If you have some doubt about the meaning of a word in the sentence, you can add a "gloss" (translation or commentary accompanying text) as a hint. Naturally, we would want the gloss to appear before we add the translation in English. To do this, press BREAK, type `EDIT50`, then press 'X' to get to the end of the line. Add `:PRINT@A,"` and space twice, then type `DOS RODAJAS=TWO SLICES`. Finish up as usual using `GOSUB3000` because we want to remain on the same page. Now run and the gloss, reminding you of the definition, appears at the top of the screen.

You may want to locate it out of the way near the bottom. If so, change `A=2` in Line 5 to `A=482`. Now run and the gloss is relocated inconspicuously. If the gloss required two lines at the bottom, the screen would scroll up in order to show the entire gloss. The semi-colon (;) won't help on the bottom line in this case. The trailing end will extend to the right side.

Now you can add the English translation, "Please bring me another cup of tea with two slices of lemon." When finished, run and note that there is one space indented on the second line. Move the line to the left margin. You may also want to take out the semi-colon (;) at the end of the translation to see how it looks with the rest of the row in green.

This is the end of our demo program. Run the entire program for a final check. You may lower a text line one row, such as the English translation line in Line 50, by adding 32 to the 'Y' value.

At this point, from Line 6, hack off `:GOTO50` so the program begins at Line 10. Type `EDIT6` and space over so the cursor is under the colon (:). Press 'H' and ENTER. You may want to change '8' in Line 6 to 'Z' to generate a random color in Line 10.

To review: Change Line 6 to the current line you are creating. This will bring you directly to the proper line without the bother of beginning at the

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first panel on Line 10 and working through all the intermediary panels to get to the one you want to study. The longer the program, the more useful Line 6 becomes.

Using the regular format, locate the first text sentence using the 'X' variable and use `GOSUB3000` to remain on the same panel. Use the 'A' variable and `GOSUB3000` for any glosses. Use the 'Y' variable and `GOSUB2000` to display the second sentence and continue on to the next panel. Remember, Line 10 is slightly different when you begin creating.

Listing 2 is what your program should look like after making suggested changes. If your demo program is OK, don't waste your time keying it in.

You may modify any line you create to suit yourself. You can reverse the lines and have the English sentence pop up first, followed by the foreign translation. You can alter it into a question-and-answer format. It is apparent that countless educational programs can be created for you, your students or children with a minimum of effort. So, go on, create! ☐

```
230 ......123
END .....125
```

Listing 1: `CORE`

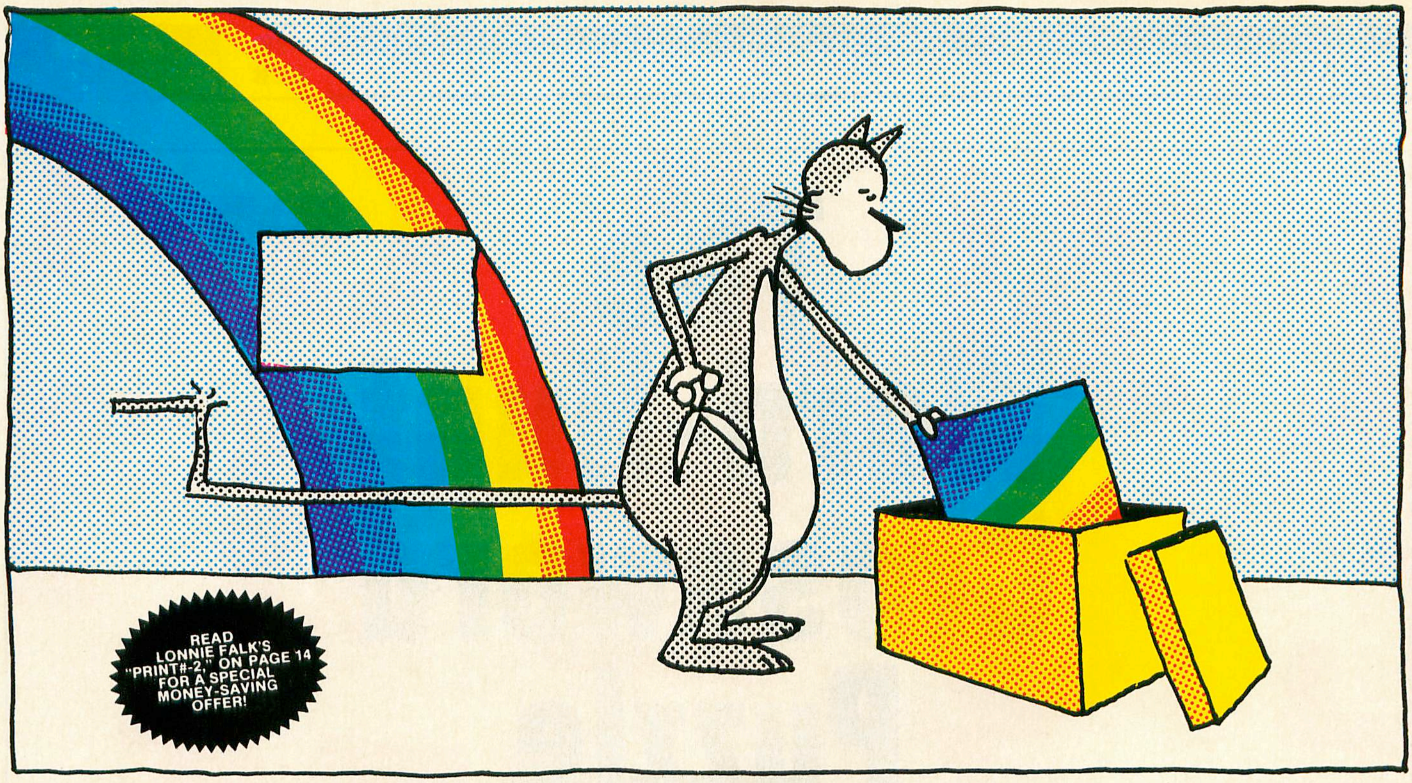
```
0 '<CORE>
5 X=96:Y=224:Z=RND(8):A=2
6 CLS(8):GOTO10
10 CLS(8):PRINT@X,"
1000 GOTO 10
2000 Z=RND(8):EXEC44539:CLS(Z):R
ETURN
3000 EXEC44539:RETURN
```

Listing 2: `LISTING2`

```
0 '<LISTING2>
5 X=96:Y=224:Z=RND(8):A=482
6 CLS(Z)
10 PRINT@X,"  C'EST UNE IDEE EXC
ELLENTE.  ";:GOSUB3000:PRINT@Y,"
  THAT IS AN EXCELLENT IDEA.  ";
:GOSUB2000
20 PRINT@X,"  SPENGA LE LUCI, PE
R FAVORE.  ";:GOSUB3000:PRINT@Y,
"  PLEASE TURN OFF THE LIGHTS.
";:GOSUB2000
30 PRINT@X,"  HABEN SIE VERSTAND
EN WAS ICH  GESAGT HABE?  ";:GOS
UB3000:PRINT@Y,"  DID YOU UNDERS
TAND WHAT I WAS SAYING?   ";:GOS
UB2000
40 PRINT@X,"  TEREI QUE AUMENTAR
 O MEU     VOCABULARIO.  ";:GOS
UB3000:PRINT@Y,"  I WILL HAVE TO
 INCREASE MY     VOCABULARY.  ";:
GOSUB2000
50 PRINT@X,"  POR FAVOR, TRAIGAM
E OTRA TAZA DE TE CON DOS RODAJA
S DE LIMON. ";:GOSUB3000:PRINT@A
,"  DOS RODAJAS=TWO SLICES   ";:G
OSUB3000:PRINT@Y+32,"  PLEASE BR
ING ME ANOTHER CUP OFTEA WITH A
SLICE OF LEMON.  ":GOSUB2000
1000 GOTO 10
2000 Z=RND(8):EXEC44539:CLS(Z):R
ETURN
3000 EXEC44539:RETURN
```

Listing 3: `JIGSAW`

```
0 'JIGSAW
10 '(C) 1984, J.KOLAR
30 PMODE3:PCLS:PMODE4
40 A=164:B=102:P=6.28
50 DIM S(2),T(2),U(2),K(2),L(2)
60 CIRCLE(4,4),4,1
66 DRAW"BM50,4R8"
67 DRAW"BM20,0F8"
68 DRAW"BM70,8E8"
69 DRAW"BM80,0BR4D8"
70 GET(0,0)-(8,8),T,G
75 GET(20,0)-(28,8),S,G
76 GET(50,0)-(58,8),U,G
77 GET(70,0)-(78,8),K,G
78 GET(80,0)-(88,8),L,G
80 PCLS:SCREEN1,1
110 FOR Z=2000TO 1712 STEP-16
111 FOR R=90 TO 50 STEP-10
120 C=C-P*270
200 X=INT(A-R*SIN(C)):Y=INT(B-R*
COS(C))
212 SOUND50,1
225 PUT(X-40,Y-10)-(X-32,Y-2),U,
OR:FORM=1TO30:NEXT
230 PUT(X-40,Y-10)-(X-32,Y-2),K,
OR:FORM=1TO30:NEXT
235 PUT(X-40,Y-10)-(X-32,Y-2),S,
OR:FORM=1TO30:NEXT
240 PUT(X-40,Y-10)-(X-32,Y-2),L,
OR:FORM=1TO30:NEXT
242 NEXTR
245 PUT(X-40,Y-10)-(X-32,Y-2),T,
PRESET
250 NEXTZ
251 FOR R=42 TO 8 STEP-5:FOR Z=8
0 TO 44 STEP-11:C=Z
252 X=INT(A-R*SIN(C+.158)):Y=INT
(B-R*COS(C+.158)):SOUND50,1
253 PUT(X-40,Y-10)-(X-32,Y-2),T,
NOT
254 PUT(X-40,Y-10)-(X-32,Y-2),T,
AND:NEXTZ,R
257 PLAY"V20O2FACEL16ECAFFACEL8E
EL4CP8V25O3ECAFL16ECAFFACEL8FFL4
AAL2CP8V20ACEFL16ACEFFECAL8AAL4F
P8V15O2CAEFL16CAEFFEACL8EEL4C"
260 GOTO 260
```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The Word-Hunt Crossword Puzzle

by Dennis Teague

Puzzle is an educational game requiring 32K and Extended Color BASIC. It may be reduced to a 16K non-Extended Color BASIC program with a few minor changes. These changes are listed in Table 1 and Table 2.

Puzzle hides up to nine words with a maximum of nine letters in length that you enter on a 10 by 16 grid. The program then asks you to find the words.

To do this, use the arrow keys to move the cursor to the first letter in the word, then press ENTER and the direction of the word (right-arrow key or down-arrow key only). Next, type the number of letters in the word. If the computer finds a match, it prints the word on the grid in inverse video. When all words are found, the computer tells how long you took and asks if you wish to run the program again.

Feel free to modify any part of this program.

(Dennis Teague, 20, is a junior at Indiana University-Purdue University in Indianapolis. He is a computer programming major and owns three Color Computers.)

Table 1

For 16K Extended Color BASIC

Delete lines 5 through 55
Delete Line 75
Delete lines 685 through 850
Delete Line 870

Table 2

For 16K Non-Extended Color BASIC

Change Line 180 to:
`180 PRINT " ";B$(A);`
Delete Line 245
Delete Line 585
Delete lines 615 through 625, 635, 650
Delete lines 855 through 935
Also, the same as 16K ECB
Also, change all `LINE INPUT`s to `INPUT`s

Program Outline

Lines	Function
5-55	Remarks for names
60-95	Get program set up
100-135	Enter words
140	Send to fill routine
145-200	Put board on screen
205-280	Find out what key is pressed and what to do
285-305	Find out direction
310-360	Find out number of letters and create check word
365-435	If check word is the same as a word entered, then change screen to inverse video
440-540	Routine to place word into array A$
545-590	Routine to fill space in array A$
595-610	Routine to tell where cursor is located
615-625	Routine to keep track of how long on this puzzle
630-855	Instructions and title page
860-965	End routine

Variable List

Variables	Function
A$	Main array, also dummy variable
B$	Word array
D$	Test variable
I$	INKEY$ variable
A,B	FOR/NEXT variable
C	Counter
D	Direction of word
H	Hours on puzzle
M	Minutes on puzzle
N	Number of letters
O	Old position
P	New position
Q	Random number
R	Position for word
S	Position for word, also seconds on puzzle
U	Helps figure PRINT@ location for inverse video
X	Number of row
Y	Number of column

140	109	740	180
275	124	790	54
400	158	875	108
530	166	END	82
650	54		

The listing: PUZZLE

```
5 '  *************************
10 ' ***    PROGRAM BY:    ***
15 ' ***   DENNIS TEAGUE   ***
20 ' ***  455 THURSTON DR. ***
25 ' ***  NOBLESVILLE, IN  ***
30 ' ***       46060       ***
35 ' *************************
40 ' ***DOCUMENTATION  HELP***
45 ' ***        BY:        ***
50 ' ***  KEITH  REYNOLDS  ***
55 ' *************************
60 CLEAR 1200
65 GOSUB 630
70 DIM A$(16,10)
75 PRINT"PUZZLE";TAB(26);"PAGE 7
"
80 FOR A=1 TO 16
85 FOR B=1 TO 10
90 A$(A,B)=CHR$(255)
95 NEXT B,A
100 FOR A=1 TO 9
105 PRINT"ENTER WORD #";A;
110 INPUT B$(A)
115 IF A=1 AND B$(1)="" THEN 105
120 IF B$(A)="" THEN 140
125 IF LEN(B$(A))>9 THEN 105
130 GOSUB 440
135 NEXT A
140 GOSUB 545
145 PRINT:PRINT" ";
150 FOR A=1 TO 10
155 FOR B=1 TO 16
160 PRINTA$(B,A);" ";
165 NEXT B,A
170 PRINT
175 FOR A=1 TO 9
180 PRINT USING " %       %";B$(
A);
185 C=C+1:IF C=3 THEN PRINT:C=0
190 NEXT A
195 O=33
200 PRINT@480,"position cursor o
n first letter";
205 I$=INKEY$
210 IF I$=CHR$(8) THEN P=P-2
215 IF I$=CHR$(9) THEN P=P+2
220 IF I$=CHR$(10) THEN P=P+32
225 IF I$=CHR$(94) THEN P=P-32
230 IF I$=CHR$(13) THEN 285
235 IF P>351 THEN P=351
240 IF P<33 THEN P=33
245 GOSUB 615
250 IF P=O THEN 265
255 GOSUB 595
260 PRINT@O,A$(Y,X);
265 PRINT@P,CHR$(192);:FOR A=1 T
O 50:NEXT A
270 PRINT@P,CHR$(255);:FOR A=1 T
O 50:NEXT A
275 O=P
280 GOTO 205
285 PRINT@480,"press arrow showi
ng direction  ";
290 I$=INKEY$
295 IF I$=CHR$(9) THEN D=1
300 IF I$=CHR$(10) THEN D=2
```

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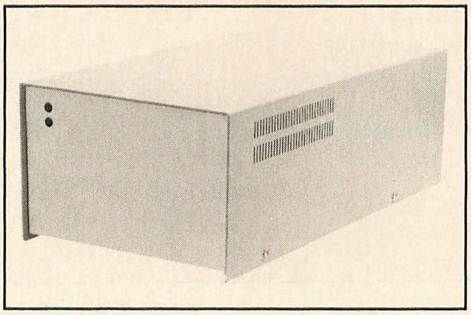

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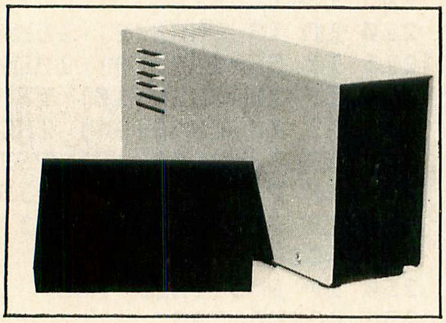

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```
305 IF D=0 THEN 290
310 PRINT@480,"press number of l
etters in word";
315 I$=INKEY$
320 N=VAL(I$)
325 IF N=0 THEN 315
330 GOSUB 595
335 IF D=1 AND Y+N-1>16 THEN 380
340 IF D=2 AND X+N-1>10 THEN 380
345 FOR A=0 TO N-1
350 IF D=1 THEN D$=D$+A$(Y+A,X)
355 IF D=2 THEN D$=D$+A$(Y,X+A)
360 NEXT A
365 FOR B=1 TO 9
370 IF D$=B$(B) THEN B$(B)="":GO
TO 390
375 NEXT B
380 D=0:D$=""
385 GOTO 200
390 GOSUB 595
395 FOR A=0 TO N-1
400 IF D=1 THEN A$(Y+A,X)=CHR$(A
SC(A$(Y+A,X))+32):PRINT@P+U,A$(Y
+A,X);:U=U+2
405 IF D=2 THEN A$(Y,X+A)=CHR$(A
SC(A$(Y,X+A))+32):PRINT@P+U,A$(Y
,X+A);:U=U+32
410 NEXT A
415 U=0:D=0:D$=""
420 FOR B=1 TO 9
425 IF B$(B)<>"" THEN 200
430 NEXT B
435 GOTO 860
440 'PUT THE WORD SOMEPLACE
445 Q=RND(2)
450 IF Q=2 THEN 500
455 R=RND(16-LEN(B$(A)))
460 S=RND(10)
465 FOR B=R TO R+LEN(B$(A))
470 IF A$(B,S)<>CHR$(255) THEN 4
45
475 NEXT B
480 FOR B=R TO R+LEN(B$(A))-1
485 A$(B,S)=MID$(B$(A),B-R+1,1)
490 NEXT B
495 RETURN
500 R=RND(10-LEN(B$(A)))
505 S=RND(16)
510 FOR B=R TO R+LEN(B$(A))
515 IF A$(S,B)<>CHR$(255) THEN 4
45
520 NEXT B
525 FOR B=R TO R+LEN(B$(A))-1
530 A$(S,B)=MID$(B$(A),B-R+1,1)
535 NEXT B
540 RETURN
545 'FILL REMAINING SPACES
550 PRINT:PRINT"PLEASE WAIT..."
```

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```
555 FOR A=1 TO 16
560 FOR B=1 TO 10
565 IF A$(A,B)<>CHR$(255) THEN 5
75
570 A$(A,B)=CHR$(RND(26)+64)
575 NEXT B,A
580 CLS
585 S=0
590 RETURN
595 'FORUMLA FOR POSITION
600 X=INT(O/32)
605 Y=((O+1)-(32*X))/2
610 RETURN
615 'TIMER SECTION
620 IF TIMER>61 THEN S=S+1:TIMER
=0
625 RETURN
630 CLS
635 PRINTSTRING$(32,"*");
640 PRINT"***";TAB(13);"PUZZLE";
TAB(29);"***";
645 PRINT"***";TAB(5);"COLOR COM
PUTER VERSION";TAB(29);"***";
650 PRINTSTRING$(32,"*")
655 PRINT:PRINT
660 PRINTTAB(15);"BY:"
665 PRINTTAB(10);"DENNIS TEAGUE"
670 PRINT@482,"PRESS <ENTER> TO
CONTINUE  ";
675 LINE INPUT A$
680 CLS
685 PRINT"PUZZLE";TAB(26);"PAGE
2";
690 PRINT:PRINT:PRINT:PRINT
695 PRINT"THE OBJECT OF THIS PRO
GRAM      IS TO FIND ALL OF THE
WORDS     THAT YOU HAVE TOLD THE
 COMPUTER TO HIDE (UP TO 9).  TH
E WORDS   MAY BE 9 OR LESS LETTE
RS IN     LENGTH."
700 PRINT@482,"PRESS <ENTER> TO
CONTINUE  ";
705 LINE INPUT A$
710 CLS
715 PRINT"PUZZLE";TAB(26);"PAGE
3";
720 PRINT
725 PRINT"STEP #1      ENTER THE
 WORDS                 THAT YOU
WANT                   TO FIND."
730 PRINT"STEP #2      PRESS <EN
TER>                   WHEN DONE
 ENTERING              WORDS (IF
 LESS                  THAN 9)."
735 PRINT"STEP #3      USING THE
 ARROW                 KEYS, MOV
E THE                  CURSOR TO
 THE                   FIRST LET
```

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PRL - prints a formatted file listing that will add line numbers, pagination, etc.
FF - creates a list of functions from a "C" source listing
MERGE - will merge one or more files together into one single file

Group No. 2
A series of helpful general utilities for all OS-9 users and programmers. Included are:
HELP - disk resident help system that avoids tying up valuable memory but that provides on-line help descriptions of almost all OS-9 commands that are commonly found in the OS-9 system and popular system upgrades
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ERR - provides on-line descriptions of numeric error codes. Does not take any extra memory as the normal error routine does.

Group No. 3
This third group of utilities is written in BASIC09. It includes:
FILEDEL - will prompt you for deletions of all files resident on a disk without repetitive typing of file and path names.
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```
TER IN                 ONE OF TH
E WORDS."
740 PRINT@482,"PRESS <ENTER> TO
CONTINUE  ";
745 LINE INPUT A$
750 CLS
755 PRINT"PUZZLE";TAB(26);"PAGE
4";
760 PRINT:PRINT:PRINT
765 PRINT"STEP #4      WHEN ON T
HE FIRST               LETTER, P
RESS THE               <ENTER> K
EY."
770 PRINT"STEP #5      THEN PRES
S THE                  DIRECTION
 THE                   WORD IS G
OING                   WITH THE
UP-ARROW               OR THE RI
GHT-ARROW.";
775 PRINT@482,"PRESS <ENTER> TO
CONTINUE  ";
780 LINE INPUT A$
785 CLS
790 PRINT"PUZZLE";TAB(26);"PAGE
5"
795 PRINT:PRINT
800 PRINT"STEP #6      THEN PRES
S THE                  NUMBER OF
 LETTERS               IN THE WO
RD (IF                 THE COMPU
TER FINDS              A MATCH I
T SHOWES               IT IN INV
ERSE                   VIDEO)."
805 PRINT"STEP #7      REPEAT ST
EPS #3-6               FOR THE R
EST OF                 THE WORDS
."
810 PRINT@482,"PRESS <ENTER> TO
CONTINUE  ";
815 LINE INPUT A$
820 CLS
825 PRINT"PUZZLE";TAB(26);"PAGE
6";
830 PRINT:PRINT:PRINT
835 PRINT"FINAL NOTE:  WHEN IN D
OUBT      CHECK THE BOTTOM LINE
OF THE    SCREEN FOR INSTRUCTION
S."
840 PRINT@484,"PRESS <ENTER> TO
START  ";
845 LINE INPUT A$
850 CLS
855 RETURN
860 FOR A=1 TO 1000:NEXT A
865 CLS
870 PRINT"PUZZLE";TAB(26);"PAGE
8"
875 PRINT:PRINT
880 H=0:M=0
885 PRINT"PUZZLE FINISHED IN:"
890 IF S>3600 THEN H=H+1:S=S-360
0:GOTO 890
895 IF S>60 THEN M=M+1:S=S-60:GO
TO895
900 IF H=0 THEN 915
905 PRINTH;"HOUR";
910 IF H>1 THEN PRINT"S" ELSE PR
INT
915 IF M=0 THEN 930
920 PRINTM;"MINUTE";
925 IF M>1 THEN PRINT"S" ELSE PR
INT
930 PRINTS;"SECOND";
935 IF S>1 THEN PRINT"S" ELSE PR
INT
940 PRINT:PRINT
945 PRINT"DO YOU WISH TO RUN THI
S PROGRAM AGAIN (Y/N)";
950 INPUT A$
955 IF LEFT$(A$,1)="Y" THEN CLS:
RUN 70
960 PRINT:PRINT"THANKS FOR RUNNI
NG 'PUZZLE'"
965 END
```

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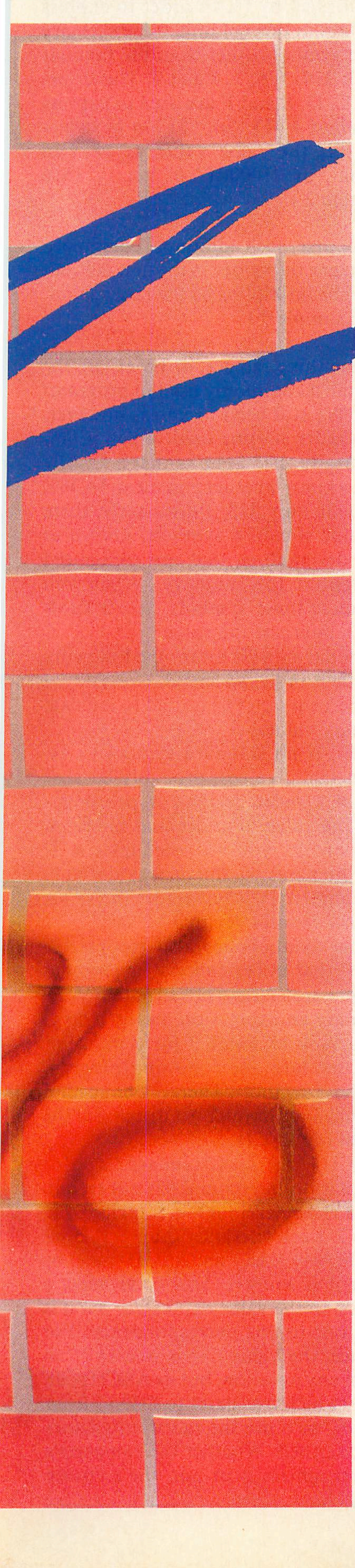

ZAPPING With Confidence

"The purpose of this program (aside from being a handy utility) is to help beginning machine language programmers hurdle a major obstacle of the interface between hardware and 'liveware': code conversions."

By Jeffry Dwight

There are three major components in any computer system: hardware, software and "liveware." The hardware is the computer itself, the physical machine and its peripheral devices, such as the monitor or the printer. The software is the program the machine runs. The software must conform to the hardware's requirements and limitations; it can't, for example, access more RAM than is currently installed. The liveware, however, can be tricky to understand. By liveware, I mean the *people* using the computer.

Some people love computers — they walk around mumbling in binary, talking about MSBs and CPUs and the fantastic CPS of the latest LPT device, or just performing bit manipulations the way others twiddle their fingers. These are the so-called "hackers." Another group, called "users," only tolerates computers. They use them at the office because the boss says they must, or at home because they believe computers are educational for the kids.

But the fastest-growing percentage of computer aficionados is somewhere between the two extremes — the sort of people who like computers and want to know more about them, but don't know how to get past the basics.

The purpose of the following program (aside from being a handy utility) is to help beginning machine language programmers hurdle a major obstacle of the interface between hardware and liveware: code conversions. Why are code conversions necessary? Because the hardware "thinks" in binary, but people don't.

(Jeffry Dwight lives in Wheaton, Ill., and is an author and programmer who also enjoys working with autistic children. His company, Jade Products, specializes in producing utilities and applications software. He is currently working on a manual of assembly language techniques for the 6809E and related microcircuits.)

Most people think in terms of decimal notation and don't know what to do when faced with something like "$B4FA," or worse yet, a string of ones and zeros. The task of software (and ergo, the software programmer) is to accept values from the user in whatever notation he finds appropriate and "translate" them into binary for the hardware to process. And of course, the software must do the same process in reverse. This is where code conversion comes in and, incidentally, where a lot of beginning programmers walk out.

A good, basic understanding of what numbers *are* does a lot to relieve beginners of their worries. The first thing to learn is that numbers are just *representations of values*. There are all sorts of ways to represent values, but all of them rely on quantification. That is, no matter what system is used, you are specifying a *quantity* when you name a value. Thus, if you have three apples in a bag, it's just as true to say, "I have three," as to say "I have 11." The difference is that in the former, the representation of the value is expressed in decimal notation; the latter used binary notation. The *value* didn't change, but the numbers did. What is missing is the *radix designator*, the symbol that tells others what value you mean when you use those numbers.

A radix is a base. Decimal notation is also called "base 10." Technically, we should say the radix is 10, since 10 is the value arbitrarily chosen as the limit. There are 10 digits (0-9) available in decimal notation. When the value we wish to express exceeds nine, we must add another "column." Since our radix is 10, the value of the digits in this new column is multiplied by 10.

The radix of binary notation is two. This means there are two digits available per column (0 and 1). If the value we wish to express exceeds one, we add another column, and the value of the digits in that column is multiplied by two (remember that the radix is two). Therefore, "11" in binary has the same value as '3' in decimal. (See Example 1.)

The radix of hexadecimal notation is 16. Thus, there are 16 digits, and the value of the digits in the second column is multiplied by 16. In order to express 16 values in one column, it is necessary to use symbols other than the familiar 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The letters A, B, C, D, E and F are used to express the values 10-15. So, "11" in hexadecimal has the same value as "17" in decimal, or "100001" in binary. (See Example 2.)

Of course, each additional column we add means the values in the new column should be multiplied by the radix again. (See Example 3.)

Example 1

```
11
|└the value of this column is multiplied by 1, so 1 x 1 = 1
└─the value of this column is multiplied by 2, so 1 x 2 = 2
                                                  ---------
                                                  1 + 2 = 3
```

Example 2

```
11
|└the value of this column is multiplied by 1, so  1 x  1 = 1
└─the value of this column is multiplied by 16, so 1 x 16 =16
                                                   ----------
                                                   1 + 16 =17
```

Example 3

```
Decimal:        1111 = 1,111 (decimal)
radix 10        |||└the value is multiplied by 1                      1
                ||└─the value is multiplied by 10 (1 x 10)           10
                |└──the value is multiplied by 100 (10 x 10)        100
                └───the value is multiplied by 1000 (10 x 100)     1000

Hexadecimal:    1111 = 4,369 (decimal)
radix 16        |||└the value is multiplied by 1                      1
                ||└─the value is multiplied by 16 (16 x 1)           16
                |└──the value is multiplied by 256 (16 x 16)        256
                └───the value is multiplied by 4096 (16 x 256)     4096

Binary:         1111 = 15 (decimal)
radix 2         |||└the value is multiplied by 1                      1
                ||└─the value is multiplied by 2 (2 x 1)              2
                |└──the value is multiplied by 4 (2 x 2)              4
                └───the value is multiplied by 8 (2 x 4)              8
```

These three radices, or bases, are the three most commonly used in programming. We still need to know, however, which radix is being used. If you promised to give me "1111" dollars, I really need to know whether you mean $4,369, $1,111 or only $15. Fortunately, there are some standard symbols, known as radix designators, that are recognized throughout the industry. When you encounter these symbols, you'll know how to interpret the value.

— A dollar sign ($) means the following value is in hexadecimal.

— A percent sign (%) is used to indicate binary values.

There is no standard symbol to denote decimal values, probably because without a radix designator people assume the value is in decimal notation. Occasionally, you will encounter a 'T' after the value — this means decimal. Sometimes a 'D' is put before the value; this also denotes decimal.

Other symbols are also recognized. An 'H' that either follows or precedes an expression means hexadecimal. A 'B' preceding an expression means binary. If you look at Table 3 for a moment, you'll see how the following program uses these symbols. There is one symbol in Table 3 we haven't yet discussed: the symbol for ASCII.

ASCII (American Standard Code for Information Interchange) is not technically a radix, although it is included in Table 3. Each character (number, letter or otherwise) has an ASCII code by which it is known. This code bears a relation to the value expressed, but it is not a one-to-one correspondence. For instance, the value *one* is written '1' in almost any notation, but its ASCII code is $31 (which translates to D49 — from now on, we'll use the radix designators just described. Whether the computer's user recognizes it or not, the software is always dealing with ASCII. Not only must values be "translated" from radix to radix, the resulting answer must be converted yet again into ASCII so it can be displayed on the screen!

To complicate matters further, the Video Display Generator chip (VDG) in your computer has its own ideas on how characters should be coded. The result is that the alphabet is stored according to its ASCII code, but numbers and special symbols (including the graphics characters) are interpreted differently.

Sometimes it is appropriate to denote an ASCII value rather than its corresponding hexadecimal or decimal equivalent. To do this, an apostrophe is commonly used just before the character. Therefore, these three assembler instructions are equivalent (that is, they indicate the same *value*):

```
LDA #'Z     ;note the glitch, which
             means ASCII
LDA #$5A    ;the dollar sign indicates
             hexadecimal
LDA #90     ;this is decimal, since
             there is no symbol
```

The notion of "equivalence" can be misleading. $5A does not *equal* D90 any more than my Volkswagen equals my Cadillac. They are but two names for the same thing — in this case, a value.

The various notations are for your convenience only. When thinking of addresses in a computer, hexadecimal seems most convenient. When thinking about the letters of the alphabet, 'A is certainly more clear than $41. And if you're trying to perform bit manipulations, then binary is best. Use whatever notation is clearest — that is, the notation that gives the most appropriate name for a given value in a given situation.

The following program, *Quickzap*, is a disk zap utility. You can change as little as one bit of one byte in a sector, or the entire sector with a few simple keystrokes. Furthermore, it allows you to see all those "invisible" characters stored on the disk in your choice of output formats. Each byte (eight bits) is translated into four notations: hexadecimal, decimal, ASCII and binary. *Quickzap* also accepts input from you in any of those four. It prints out an entire sector in your chosen notation, searches through an entire disk for a string of characters, and even copies, sector by sector, one disk to another (or to itself).

In addition, there is an eight-bit calculator built in that allows you to add, subtract, multiply, divide, logical AND, logical OR, exclusive OR and rotate (in either direction) any values you supply. The calculator is also handy for immediate code conversions: Set the output for one radix and give your input in another. Refer to Table 1 for an explanation of the calculator's functions.

Type in the assembler listing (if you are using Radio Shack's assembler, you must use *EDTASMOV* or there won't be room) and save it to disk, then assemble it to disk. If you have errors, correct them before running the utility; you don't want to risk destroying information on your disk! Use the name "QUICKZAP."

From BASIC, type `LOADM"QUICKZAP"` and press ENTER. The utility will boot itself, so there's no need to type `EXEC`.

Table 2 shows *how to move* the cursors around on the screen. The lower cursor is your "offset location." When first loading the program, it is set to the first (or zero) location. Your input and output defaults are set to decimal (notice the top line on the screen), and the byte under your offset cursor is expanded into the four notations. The current track, sector and offset number are displayed in decimal. You have a choice of Hex or decimal for these three displays. If you choose either binary or ASCII as your output default, the track, sector and offset number will show up in Hex. Refer to Table 3 and try changing your input/output defaults.

Table 4 shows the one-letter commands that *Quickzap* recognizes. They are all fairly self-explanatory, and a little experimentation will clear up any

Table 1: The *Quickzap* Calculator

Symbol	Syntax	Description
+	A+B=	Adds value A to value B
–	A–B=	Subtracts value B from value A
*	A*B=	Multiplies value A times value B
/	A/B=	Divides value A by value B
&	A&B=	Logically ANDs value A with value B
.	A.B=	Logically ORs value A with value B
:	A:B=	Exclusive ORs value A with value B
>	A>n=	Rotates A to the right 'n' times
<	A<n=	Rotates A to the left 'n' times

Note: These are all eight-bit (one-byte) operations. Thus, rotating a value nine times in either direction produces the original value. Since 255 is the maximum value any byte may contain, the operation 255+1 will yield a sum of zero (the carry is "hidden").

Table 2: *Quickzap* Cursor Control

Key	Operation
Down arrow	Move offset cursor forward one space
Up arrow	Move offset cursor back one space
SHIFT/Up arrow	Move offset cursor to the first position
SHIFT/Down arrow	Move offset cursor to the last position
Right arrow	Move input cursor forward one position
Left arrow	Move input cursor back one position
SHIFT/Right arrow	Insert a blank space under input cursor
SHIFT/Left arrow	Delete character under input cursor

Note: *Quickzap* has *two* cursors that may be moved independently of each other. The lower one is the offset cursor, and it signifies the offset (in bytes) from the zero byte of the currently displayed sector. The upper cursor is your input cursor. This blinks to show your place as you enter commands to *Quickzap*.

questions. I strongly recommend, however, you practice on a disk that doesn't contain information you need to save. There is no protection built into *Quickzap* — you may change the directory and the file allocation table as easily as anything else. If you're not sure what you're doing at first, use *Quickzap* only to examine the contents of the disk — don't rewrite any sectors. If you rewrite the directory accidentally, BASIC would no longer be able to access your files!

There are two things to mention about printing out the contents of a sector. First, some printers (non-Radio Shack) require a line feed in addition to the carriage return. *Quickzap* provides for this in the assembly process; if you want line feeds, change Line 1546 to LFEED FCB $0A before assembling the utility.

The other thing concerns Baud rates. *Quickzap*'s command 'P' will print out a sector according to the preset Baud rate. If you want to change this rate, enter Pn, where 'n' equals the Baud rate desired. Since *Quickzap* only recognizes eight-bit values, the following values are used.

If n = 1, Baud is 120
If n = 3, Baud is 300
If n = 6, Baud is 600
If n = 12, Baud is 1200
If n = 24, Baud is 2400
If n = 96, Baud is 9600

The subroutines that provide the code conversions are fairly simple. If you examine the listing, you'll see that they all operate on one byte at a time and proceed in a logical fashion. Four BASIC ROM calls are used: `CLS`, located at $A928; Printer-out, at $A2BF; `POLCAT`, called indirectly at $A000; and `DSKCON`, also called indirectly, at $C004. The first two are "undocumented" routines, but work on every version of BASIC I've encountered. The second two are documented, and therefore guaranteed by Microsoft.

The IRQ and RESET vectors are changed by the entry routine and normalized only when you terminate the

Table 3: *Quickzap* Input/Output Options

Command	Description
I*r*	Sets input default to specified radix (*r*)
O*r*	Sets output default to specified radix (*r*)

'*r*' may be any one of these characters: A, B, D or H. These letters represent the desired radix (or base) you want *Quickzap* to use.

A	ASCII: values will be displayed as ASCII characters.
B	Binary: values will be displayed as a string of eight characters. Example: 00110010
D	Decimal: values will be displayed in decimal (base 10)
H	Hexadecimal: values will be displayed in hexadecimal (base 16). Example: FF

ASCII is not actually a radix, but is a useful display mode. Note that when displaying in ASCII, Bit 7 is undefined. Thus, only the least significant seven bits (0-6) determine the ASCII character that will be displayed.

You may override the input default by prefacing the value with one of the radix designators. Examples: HFF, B11110000, D255. If you do not use a radix designator, *Quickzap* assumes your value is to be interpreted according to the default radix.

To provide compatibility with accepted nomenclature, the following symbols are included in *Quickzap*'s vocabulary:

$	Hexadecimal value (same as 'H')
%	Binary value (same as 'B')
'	ASCII value (same as 'A')

If you are entering hexadecimal values alone (that is, without prefacing them with a radix designator) it is necessary to include a zero before any non-numeric characters. For example, if the input default is hexadecimal, any of the following is valid: $FF, HFF, OFF. The zero tells *Quickzap* that the following characters are values rather than commands.

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utility. The only way to exit the utility is by entering the 'Q' (Quit) command. If you press the Reset button, *Quickzap* will reinitialize itself. The interrupt-driven parts of the utility control the disk drive motor, handle the booting process and allow for repeating keys.

There is not enough space here to detail all of the routines *Quickzap* uses, but if you're interested in code conversions, a careful study of the source listing explains how the various tasks are accomplished. Of course, if all you want is to "zap" some disks, then ignore the listing and have fun.

I realize the listing requires a lot of typing, but when it's all assembled, it only uses 2.5K of RAM ($AC0, to be precise), so it will work on any machine with at least 16K.

Several "tricks" have been used to keep the utility's size down to manageable levels. First, the text screen itself is used as the main I/O buffer. This saves

Table 4: *Quickzap* Command Functions

Key	Syntax	Description
T	T	Change track to 'n' (n = 0 to 34).
S	S*n*	Change sector to 'n' (n = 1 to 18).
R	R:*n*	Read display track/sector from Drive 'n'. The drive number is optional. If included, the value of 'n' must be between zero and three.
W	W:*n*	Write out the data on the screen to the displayed track/sector on Drive 'n'.
+	+	Increase displayed sector by one. If necessary, also increase the displayed track number.
–	–	Decrease displayed sector by one. If necessary, also decrease the displayed track number.
I	I*r*	Set input default to 'r' (see Table 3).
O	O*r*	Set output default to 'r' (see Table 3).
C	C*s,d,1*	Copy data beginning at offset 's' to destination starting at offset 'd' for a length of 'l'.
X	X*s,d,1*	Exchange data beginning at offset 's' with data starting at offset 'd' for a length of 'l'.
F	F*v,1*	Fill sector, beginning at displayed offset, with value 'v' for length of 'l'.
M	M*string*	Match string. Search the disk, beginning with currently displayed track/sector, for a match; string may be any string of ASCII characters.
ENTER		Terminates a command line.
=		Terminates request for eight-bit calculation (similar to Microsoft's ZBUG). Syntax is "value operation value =" for calculations, or "value =" for code conversion. See text and Table 1 for examples.
,	*f,f*	The comma is used to separate multiple functions within a single line of input.
P	P	Print sector to line printer.
P	P*n*	Set printer Baud rate to 'n'. See text for values.
N	N*n*	Change offset cursor number to 'n' (n = 0 to 255).
G	G*n*	Calculate proper track and sector for granule number 'n' and set them accordingly (n = 0 to 67).
Q	Q	Quit. Performs a "cold" restart and returns control of the computer to BASIC.

Note: *Quickzap* does not allow any operations on a command line that follow a READ or WRITE operation. This is to help prevent mistakes. All other commands may be concatenated at your discretion. Examples are IH,0B,P03,P ENTER (set the input default to hexadecimal, the output default to binary, the Baud rate to 300 and print); ++R ENTER (increase the sector by two, and read the resulting track/sector); and FH20,H20,W:2 ENTER (fill 20 Hex bytes with Hex 20 and write the track/sector out on Drive 2).

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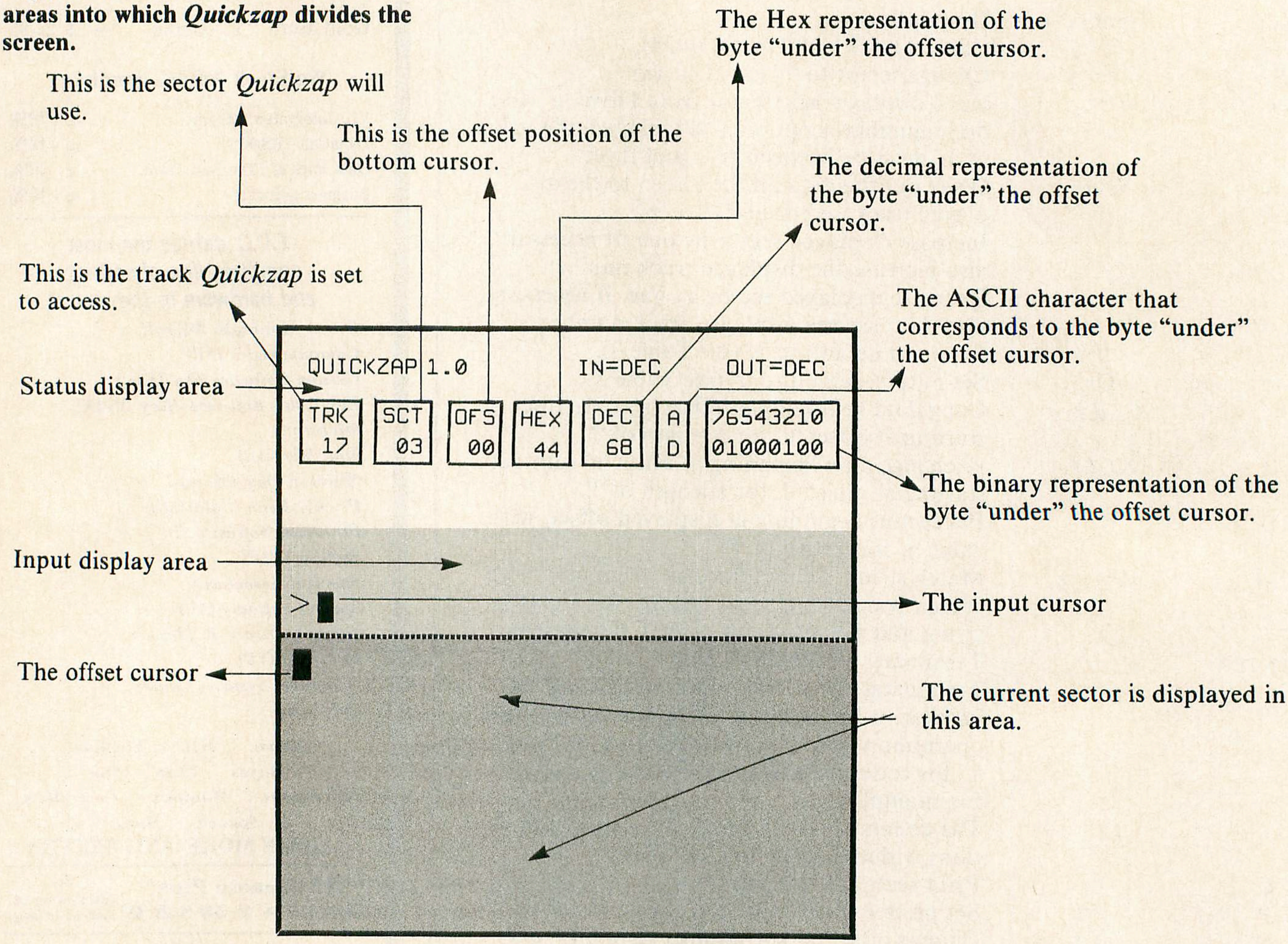
bytes and also eliminates the need to move data around before and after accessing the disk. Second, most of the variables and buffers are kept on the "direct page" (addresses $0000 - $00FF), which makes for quicker, shorter code. Also, some of the routines — most notably GRAN, which calculates track and sector for a given granule — are elegant, avoiding conditional branches and thus saving time and memory. Elegant algorithms are harder to understand, but well worth the effort, since once you've puzzled them out, you have an excellent grasp of the individual bit manipulations involved in each processor instruction.

Although *Quickzap* is a very useful utility as it stands, and may be used without understanding how it works, it was written primarily to demonstrate methods of converting different codes into binary and back. Therefore, it was written in a modular fashion, with the separate routines each performing one specific function. Feel free to borrow or adapt these algorithms in your own programs, or to modify *Quickzap* itself. There are as many ways to approach code conversions as there are programmers and the right method for you may be different from the one I've chosen.

For those without an editor/assembler who, nevertheless, would like to have *Quickzap*, an assembled version is available on disk for $10. You may write to me at 519 N. Scott Street, Wheaton, IL 60187, if you have any questions or would like a copy. ☐

Figure 1: Shows functions of three areas into which *Quickzap* divides the screen.


The Hex representation of the byte "under" the offset cursor.
This is the sector Quickzap will use.
This is the offset position of the bottom cursor.
The decimal representation of the byte "under" the offset cursor.
This is the track Quickzap is set to access.
The ASCII character that corresponds to the byte "under" the offset cursor.
Status display area
QUICKZAP 1.0
IN=DEC
OUT=DEC
TRK 17
SCT 03
OFS 00
HEX 44
DEC 68
A D
76543210 01000100
The binary representation of the byte "under" the offset cursor.
Input display area
>
The input cursor
The offset cursor
The current sector is displayed in this area.

This is an illustration showing the functions of the three areas into which *Quickzap* divides your screen. Your input cursor is controlled with the right- and left-arrow keys; the offset cursor is controlled with the up- and down-arrow keys. The light gray area works just like an abbreviated screen in BASIC. The only difference is that it is only four lines deep. The lines will scroll within this area without affecting the other two areas.

The top (shown in white) contains status information and expansions of the bytes "under" the offset cursor. Whatever values are entered on the input line appear at the offset cursor location, and the offset cursor moves forward one position.

The dark gray area is where the 256 bytes of each sector are displayed. Since many of these bytes are non-ASCII, the screen may appear to be filled with "garbage." If you want to see the actual value of a non-ASCII character, simply postion the offset cursor over the byte you want to view. The status line reveals the contents of that byte in four notations: Hex, decimal, ASCII (if applicable) and binary. Non-ASCII characters show up on the bottom half of the screen either as block graphics or as inverted ASCII. For instance, the value zero shows up as a reversed '@' sign, and a space character ($20) shows up as a dark block.

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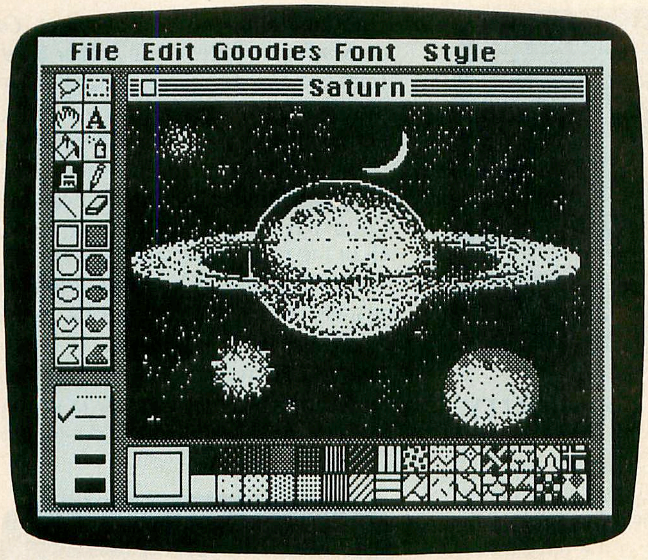
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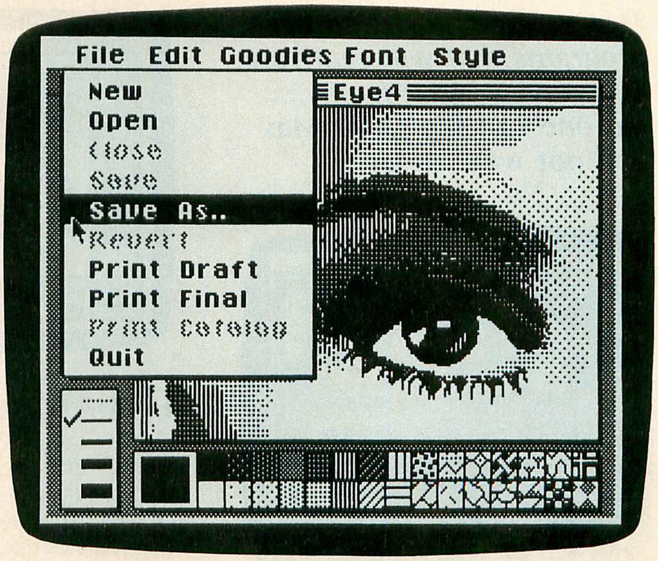
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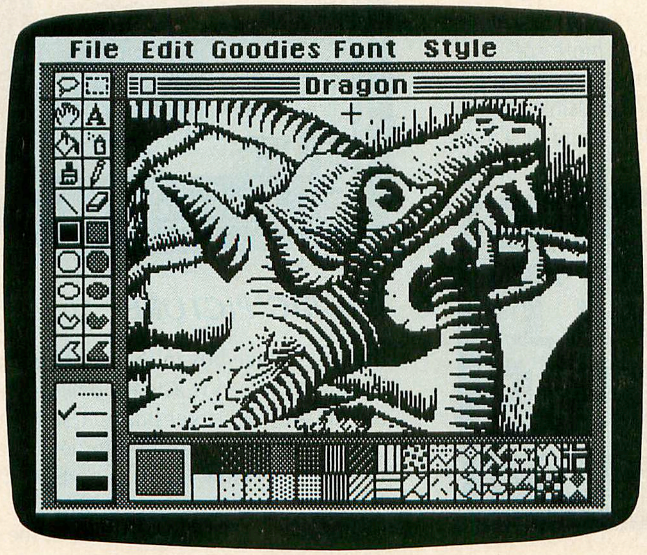
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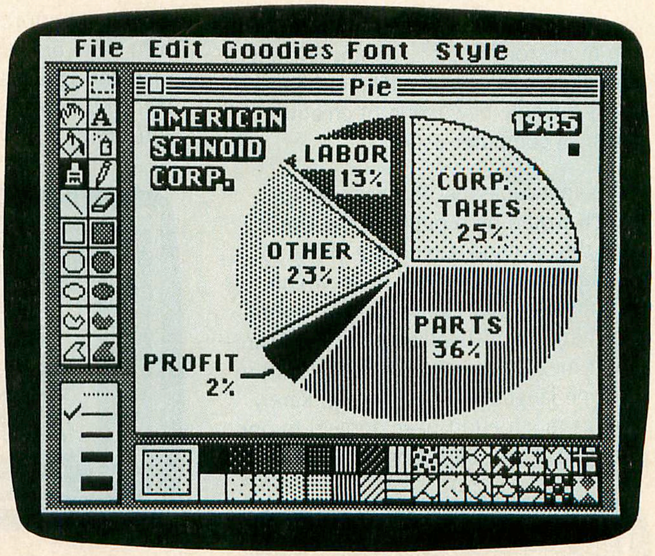
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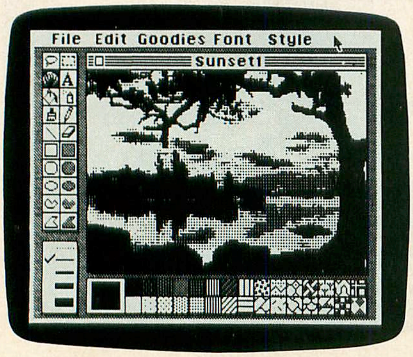
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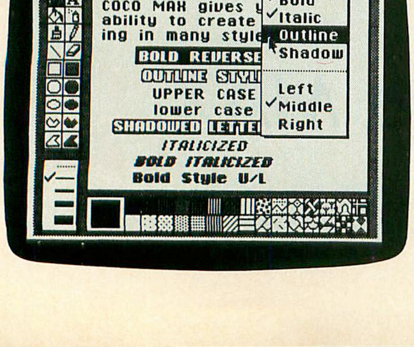
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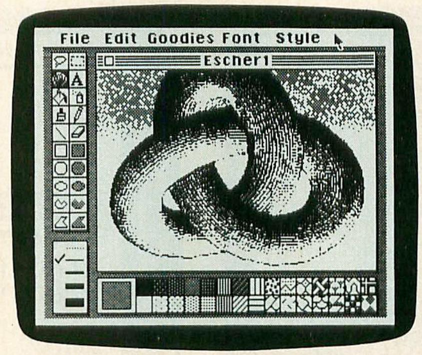
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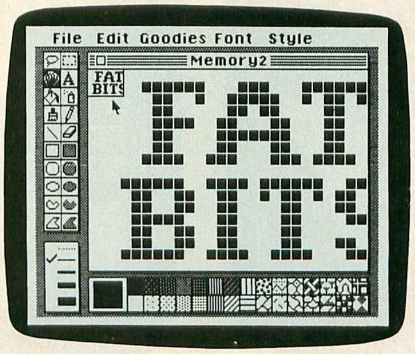
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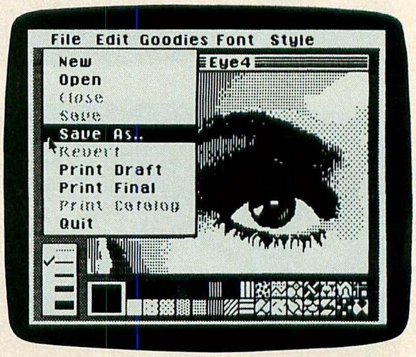
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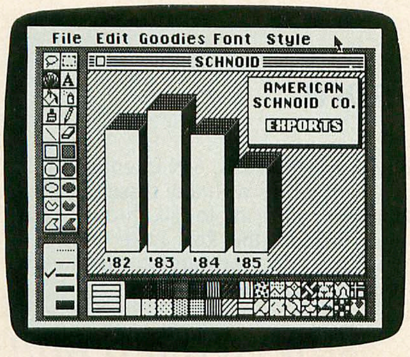

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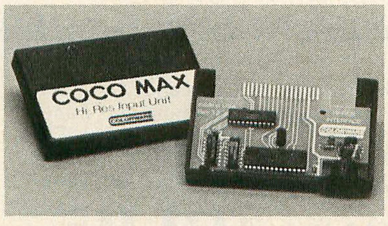

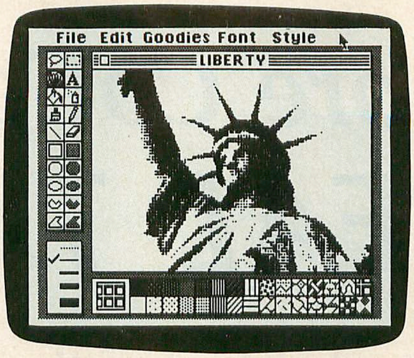

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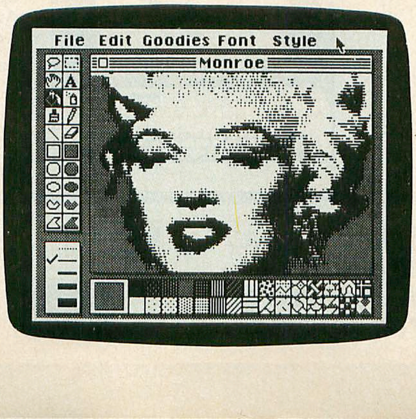
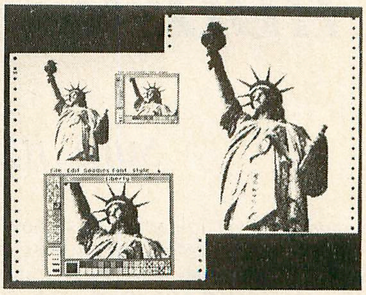
A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its *own software* on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

THE COMPLETE COCO MAX SYSTEM, with software on *DISK*........... ***$69.95***

with software on *CASSETTE* (Available Mar '85)......................... ***$69.95***

Y-BRANCHING CABLE-If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo..... ***$27.95***

Sorry, COCO MAX is not compatible with JDOS

COLORWARE

Colorware Inc.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA
MasterCard

ORDERING INFORMATION

ADD $3.00 PER ORDER FOR SHIPPING AND HANDLING.
C.O.D.'S ADD $3.00 EXTRA.
SHIPPING AND HANDLING FOR CANADA IS $5.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

Why do more CoCo owners choose 'REAL TALKER'?

Sure it's priced right, but there's more...

Thousands of 'Real Talker' owners know 'Real Talker' beats ALL other Coco voice synthesizers in ease of use and flexibility. And, NO other Coco talker has a clearer, more intelligible voice. That's quite a lot of advantage when you consider Real Talker's unbeatable price. Yet, Real Talker has some important features that you simply will not find in other Coco talkers:

'Real Talker' is compatible with any 16K, 32K, 64K Extended or non-extended Color Computer. It works with any cassette or disk system and comes complete and ready to talk through your T.V. or monitor speaker. Price includes the 'Real Talker' electronic voice synthesizer in a ROM pack, software on cassette (may be transferred to disk), and user manual.

'SAY' command - You'll have your computer talking brilliantly in just minutes thanks to this powerful new command. Type SAY "ANYTHING YOU WANT" and your words are instantly spoken. It's that simple. Think how easy this makes creating speaking Basic programs. Adding speech to your existing programs is a snap too.

'CONVERT' - This is a truly powerful command for the basic programer. CONVERT automatically transforms a machine language dependent speaking program into a stand-alone Basic program. In other words, you can effortlessly write speaking Basic programs that do not require a machine language translator in memory. This is a unique feature of 'Real Talker'. No other voice synthesizer gives you anything even remotely approaching this type of capability - even synthesizers costing considerably more.

'REAL TALKER'
INSTRUCTION
'REAL TALK
HARDWARE VOI
SYNTHESIZER
COLORWARE

'Real Talker' is a full-featured electronic voice synthesizer unit built into a compact cartridge case. You simply plug it into the side of your computer.

NOW INCLUDED WITH 'REAL TALKER'........

1. ***'DR. TALK***-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.
2. ***'TALKING BATTLESHIP'***-It's you vs. the computer in this speaking version of the classic game.
3. ***'TALKING BLACKJACK'***- Play for big stakes against a rather talkative casino dealer.

ONLY

$59.95

Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

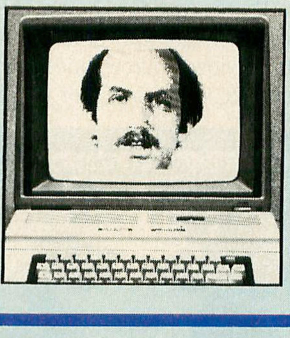
'REAL TALKER-1' (for the original Color Computer)...............***$59.95***

'REAL TALKER-2' (for the Color Computer-2)..........................***$64.95***

'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together....................................***27.95***

TALKHEAD

If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



ACTUAL UNRETOUCHED PHOTO

SOFTWARE FOR THE 'REAL TALKER'

TALKHEAD can be easily commanded in Basic to appear on screen and say anything you want. Available on cassette or disk for only $19.95, TALKHEAD requires 64K and a Colorware 'Real Talker'.

ONLY $19.95

COLORWARE

COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA
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★★★ ORDERING INFORMATION ★★★

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C.O.D.'S ADD $3.00 EXTRA.
SHIPPING AND HANDLING FOR CANADA IS $5.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

The listing: QUICKZAP

```
                 00100 *****************************
                 00101 *                           *
                 00102 *      QUICKZAP 1.0         *
                 00103 *    Disk Zap Utility       *
                 00104 *  and 8-bit calculator     *
                 00105 *                           *
                 00106 *   Copyright [c] 1985      *
                 00107 *   by Jeffry Dwight        *
                 00108 *                           *
                 00109 *****************************
                 00110
                 00112
                 00114
                 00115 *
                 00116 *** DIRECT PAGE REFERENCE
                 00117 *
                 00118
0000             00119 OFFSET   EQU  $0000
0002             00120 STOP     EQU  $0002
0003             00121 OUT      EQU  $0003
0004             00122 IN       EQU  $0004
0005             00123 TEMP0    EQU  $0005
0006             00124 TEMP1    EQU  $0006
0007             00125 TEMP2    EQU  $0007
0009             00126 LPTBUF   EQU  $0009
0014             00127 INPBUF   EQU  $0014
0036             00128 FLAG     EQU  $0036
0037             00129 PAUSE    EQU  $0037
0038             00130 KEYBUF   EQU  $0038
006F             00131 DEVICE   EQU  $006F
0071             00132 ROMTST   EQU  $0071
0072             00133 ROMJMP   EQU  $0072
0074             00134 MAXMEM   EQU  $0074
0088             00135 CURSOR   EQU  $0088
0095             00136 BAUD     EQU  $0095
009D             00137 EXECAD   EQU  $009D
                 00138
                 00139 *
                 00140 *** SYMBOLIC EQUATES
                 00141 *
                 00142
0012             00143 MAXSCT   EQU  $0012
0022             00144 MAXTRK   EQU  $0022
0043             00145 MAXGRN   EQU  $0043
0152             00146 ROLOVR   EQU  $0152
010C             00147 VECJMP   EQU  $010C
010D             00148 VECTOR   EQU  $010D
0985             00149 DELAY    EQU  $0985
A000             00150 POLCAT   EQU  $A000
A928             00151 ROMCLS   EQU  $A928
A2BF             00152 ROMLPT   EQU  $A2BF
C004             00153 DSKCON   EQU  $C004
C006             00154 PARMAD   EQU  $C006
FF02             00155 PIA1     EQU  $FF02
FF03             00156 PIA2     EQU  $FF03
FF22             00157 STATUS   EQU  $FF22
FF40             00158 MOTOR    EQU  $FF40
FFFE             00159 COLD     EQU  $FFFE
                 00160
                 00162
                 00163 *
                 00164 *** INITIALIZATION PROCS
                 00165 *
                 00166
0E00             00167          ORG  $0E00
                 00168
                 00169 *** CODE BEGINS HERE
                 00170
0E00 12          00171 ENTRY NOP
0E01 1A    50    00172 ORCC #$50
0E03 4F          00173 CLRA
0E04 1F    8B    00174 TFR A,DP
0E06 10DE  74    00175 LDS <MAXMEM
0E09 97    6F    00176 STA <DEVICE
0E0B 86    44    00177 LDA #'D
0E0D 97    03    00178 STA <OUT
0E0F 97    04    00179 STA <IN
0E11 8E    0E6D  00180 LDX #IRQ
0E14 86    7E    00181 LDA #$7E
0E16 B7    010C  00182 STA >VECJMP
0E19 BF    010D  00183 STX >VECTOR
0E1C 8E    0E00  00184 LDX #ENTRY
0E1F 86    55    00185 LDA #$55
0E21 97    71    00186 STA <ROMTST
0E23 9F    72    00187 STX <ROMJMP
0E25 1C    AF    00188 ANDCC #$AF
0E27 B6    FF03  00189 LDA >PIA2
0E2A 8A    01    00190 ORA #1
0E2C B7    FF03  00191 STA >PIA2
0E2F BD    A928  00192 JSR >ROMCLS
0E32 8E    1869  00193 LDX #FORM1
0E35 BD    15C3  00194 JSR PRINT
0E38 8E    04C0  00195 LDX #$4C0
0E3B 9F    88    00196 STX <CURSOR
0E3D 86    0D    00197 LDA #$0D
0E3F BD    10CD  00198 JSR CHROUT
0E42 86    3E    00199 LDA #$3E
0E44 BD    10CD  00200 JSR CHROUT
0E47 8E    04E0  00201 LDX #$4E0
0E4A CC    6D20  00202 LDD #$6D20
                 00203
```

Co Co - Cooler Too

- **Brings operating temperature to ambient, regardless of accessory load**
- **Reduces temperature of ENTIRE computer . . . not just the SAM chip**
- **Easy 1-minute installation**
- **$44.95**

Companion Keyboard Cover $9.95

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- *Add $4.00 Shipping For: AK, HI, APO's, P.O. Boxes, & Canada*
- *Add $15.00 Shipping For Overseas*
- *Add $3.00 For 220-250 Volt Model*
- *California Residents Add 6½% Sales Tax*
- *Add $3.00 For C.O.D.*

REM Industries, Inc.
9420 "B" Lurline Ave., Chatsworth, CA 91311
(818) 341-3719

```
0E4D A7    80        00204 ENTRY1 STA ,X+
0E4F 5A              00205  DECB
0E50 26    FB        00206  BNE ENTRY1
0E52 10BE  C006      00207  LDY >PARMAD
0E56 CC    1103      00208  LDD #$1103
0E59 ED    22        00209  STD 2,Y
0E5B 86    02        00210  LDA #2
0E5D BD    1241      00211  JSR DOIO
0E60 6D    26        00212  TST 6,Y
0E62 26    03        00213  BNE EXIT
0E64 BD    0EED      00214  JSR MAIN
                     00215
0E67 0F    71        00216 EXIT CLR <ROMTST
0E69 6E    9F FFFE   00217  JMP [COLD]
                     00218
                     00219
                     00220
                     00221
                     00222
                     00223 *
                     00224 *** INTERRUPT HANDLER
                     00225 *
                     00226
0E6D B6    FF03      00227 IRQ LDA >PIA2
0E70 2A    5F        00228  BPL IRQOUT
0E72 B6    FF02      00229  LDA >PIA1
0E75 8E    0E00      00230  LDX #ENTRY
0E78 9C    9D        00231  CMPX <EXECAD
0E7A 26    08        00232  BNE IRQ1
0E7C AF    6A        00233  STX $0A,S
0E7E 8E    B44A      00234  LDX #$B44A
0E81 9F    9D        00235  STX <EXECAD
0E83 3B              00236  RTI
```

The Color Link Incorporated Brings Power to Your Fingertips

Now you can do —

ROBOTICS! BURGLAR ALARMS! OPTICAL SCANNING! INDUSTRIAL CONTROL!

With our —

Data Acquisition and Output Board

and our —

Task Modules

No special skills necessary. No soldering required. Just plug it in, hook up a module, and you're off! The Color Link will take you by the hand into the world of computer control. Our modular expansion makes it easy to configure the system to your needs. Run your house, control a robot, make sophisticated burglar detection systems, scan in pictures or print. The DAOB can handle almost any job.

FREE SOFTWARE INCLUDED!!! Obviously, the DAOB is useless without a program to help you control it. The DAOB's power is only as limited as your own imagination so we cannot provide software for every application but we can provide some good general routines that allow you to do most things.

One demonstration of the versatility of our DAOB is its ability for OPTICAL SCANNING (using the Optical Scanning Module). Never has this feature been so affordable. You can scan in pictures or print automatically by attaching our Optical Sensor Module to your printer (or manually scan in print).

The DAOB can do many other interesting and useful things utilizing its many Task Modules. You can use your computer for a low-cost, sophisticated BURGLAR DETECTION system just by plugging in our DAOB, one or more light sensors and an output device such as an alarm or auto-dial phone. Plug in a digital voltmeter module and convert your computer to a slow-speed STORAGE OSCILLOSCOPE or a DIGITAL MULTIMETER! Run your morning bath to exactly the tempurature you like — before you get up — by computer control! Use your computer for an EXPLOSIVE GAS SENSOR, monitor the tempurature in every room, measure SOLAR INTENSITY, HUMIDITY, WINDSPEED, check for moisture in your basement, get out a map and use your computer to measure distances on the map.

We don't have enough space to begin describing everything you can do with our DAOB but we can tell you that most things simply require roughly the same knowledge and skill that it takes to hook up a television antenna. It only requires one DAOB to do many tasks because it can handle most things simultaneously.

Our board is a highly sophisticated piece of electronic hardware but is easy to use for just that reason. For those of you who enjoy technical specs our board boast 8 bit analog to digital accuracy with a full scale as low as 20 mv and 30us conversion time. It has 26 on board input channels (expandable with modules to 176) and 16 on-board output channels (expandable to 48) with output voltages from 0-5 volts dc in 20mv septs including 4 programmable interrupts. For flexibility our scales and channels are software selectable and its DISK COMPATIBLE!!!

At only $99.95 you'll want to make the DAOB your next hardware purchase. Below are just a few of the modules available.

DAOB	$99.95	Optical Scanner	$49.95
Tempurature Sensor 1	$5.95	Tempurature Sensor 2	$8.95
AC Current Sensor	$9.95	Digital Voltmeter	$14.95
Voice Pickup	$6.95	Solar Intensity Sensor	$9.95
Light Sensor	$6.95	Windspeed Sensor	$12.95
Motor Controller	$8.95-$49.95	AC Device Switch	$12.95

For a free brochure listing all add-on modules with application hints call or write to: The Color Link Incorporated, PO Box 74B, Marissa IL 62257 ph: (618) 587-2441. Shipping and handling $2.00. IL residence add 6.25% sales tax.

```
                     00237
0E84 7D    0985      00238 IRQ1 TST >DELAY
0E87 27    10        00239  BEQ IRQ2
0E89 7A    0985      00240  DEC >DELAY
0E8C 26    0B        00241  BNE IRQ2
0E8E B6    0986      00242  LDA >DELAY+1
0E91 84    B0        00243  ANDA #$B0
0E93 B7    0986      00244  STA >DELAY+1
0E96 B7    FF40      00245  STA >MOTOR
                     00246
0E99 8E    0152      00247 IRQ2 LDX #ROLOVR
0E9C CE    0038      00248  LDU #KEYBUF
0E9F C6    08        00249  LDB #8
0EA1 0F    36        00250  CLR <FLAG
0EA3 03    36        00251  COM <FLAG
                     00252
0EA5 A6    80        00253 IRQ3 LDA ,X+
0EA7 A1    C4        00254  CMPA ,U
0EA9 27    0A        00255  BEQ IRQ4
0EAB 0F    36        00256  CLR <FLAG
0EAD 34    02        00257  PSHS A
0EAF 86    10        00258  LDA #$10
0EB1 97    37        00259  STA <PAUSE
0EB3 35    02        00260  PULS A
                     00261
0EB5 A7    C0        00262 IRQ4 STA ,U+
0EB7 5A              00263  DECB
0EB8 26    EB        00264  BNE IRQ3
0EBA 0D    36        00265  TST <FLAG
0EBC 27    13        00266  BEQ IRQOUT
0EBE 0A    37        00267  DEC <PAUSE
0EC0 26    0F        00268  BNE IRQOUT
0EC2 86    02        00269  LDA #2
0EC4 97    37        00270  STA <PAUSE
0EC6 8E    0152      00271  LDX #ROLOVR
0EC9 CC    FF08      00272  LDD #$FF08
                     00273
0ECC A7    80        00274 IRQ5 STA ,X+
0ECE 5A              00275  DECB
0ECF 26    FB        00276  BNE IRQ5
                     00277
0ED1 3B              00278 IRQOUT RTI
                     00279
                     00280
                     00281
                     00282
                     00283
                     00284 *
                     00285 *** MAIN CONTROL LOOP
                     00286 *
                     00287
                     00288 *** CURSOR ADJUSTMENTS
0ED2 0A    01        00289 ADJ1 DEC <OFFSET+1
0ED4 0A    01        00290  DEC <OFFSET+1
                     00291
0ED6 0C    01        00292 ADJ2 INC <OFFSET+1
0ED8 20    13        00293  BRA MAIN
                     00294
0EDA 0F    01        00295 ADJ3 CLR <OFFSET+1
0EDC 20    0F        00296  BRA MAIN
                     00297
0EDE 0F    01        00298 ADJ4 CLR <OFFSET+1
0EE0 0A    01        00299  DEC <OFFSET+1
0EE2 20    09        00300  BRA MAIN
                     00301
0EE4 8C    04DF      00302 CLEAR CMPX #$4DF
0EE7 27    0B        00303  BEQ MAIN0
0EE9 E7    80        00304  STB ,X+
0EEB 20    F7        00305  BRA CLEAR
                     00306
                     00307 *** INPUT NEXUS
0EED 86     05       00308 MAIN LDA #5
0EEF 97     00       00309  STA <OFFSET
0EF1 BD     1548     00310  JSR DISP
                     00311
0EF4 BD     1094     00312 MAIN0 JSR GETKEY
0EF7 81     5E       00313  CMPA #$5E
0EF9 27     D7       00314  BEQ ADJ1
0EFB 81     0A       00315  CMPA #$0A
0EFD 27     D7       00316  BEQ ADJ2
0EFF 81     5F       00317  CMPA #$5F
0F01 27     D7       00318  BEQ ADJ3
0F03 81     5B       00319  CMPA #$5B
0F05 27     D7       00320  BEQ ADJ4
0F07 9E     88       00321  LDX <CURSOR
0F09 C6     60       00322  LDB #$60
0F0B 81     0C       00323  CMPA #$0C
0F0D 27     D5       00324  BEQ CLEAR
0F0F 81     03       00325  CMPA #3
0F11 27     38       00326  BEQ MAIN3
0F13 81     0D       00327  CMPA #$0D
0F15 27     20       00328  BEQ MAIN2
0F17 81     08       00329  CMPA #8
0F19 27     17       00330  BEQ MAIN1
0F1B 81     09       00331  CMPA #9
0F1D 27     13       00332  BEQ MAIN1
0F1F 81     15       00333  CMPA #$15
0F21 27     34       00334  BEQ MAIN4
0F23 81     5D       00335  CMPA #$5D
0F25 27     3F       00336  BEQ MAIN6
0F27 81     3D       00337  CMPA #'=
0F29 1027 0046       00338  LBEQ CALC
0F2D 8C     04DF     00339  CMPX #$4DF
0F30 24     C2       00340  BHS MAIN0
                     00341
0F32 BD     10CD     00342 MAIN1 JSR CHROUT
0F35 20     BD       00343  BRA MAIN0
                     00344
0F37 8E     04DE     00345 MAIN2 LDX #$4DE
0F3A 9F     88       00346  STX <CURSOR
0F3C BD     1039     00347  JSR FILBUF
0F3F 1F     31       00348  TFR U,X
0F41 BD     1023     00349  JSR OK
0F44 0D     02       00350  TST <STOP
0F46 26     03       00351  BNE MAIN3
0F48 BD     1384     00352  JSR COMM
                     00353
0F4B 86     0D       00354 MAIN3 LDA #$0D
0F4D BD     10CD     00355  JSR CHROUT
0F50 86     3E       00356  LDA #'>
0F52 BD     10CD     00357  JSR CHROUT
0F55 20     96       00358  BRA MAIN
                     00359
0F57 A6     01       00360 MAIN4 LDA 1,X
0F59 A7     80       00361  STA ,X+
0F5B 8C     04DE     00362  CMPX #$4DE
0F5E 23     F7       00363  BLS MAIN4
                     00364
0F60 86     60       00365 MAIN5 LDA #$60
0F62 A7     84       00366  STA ,X
0F64 20     8E       00367  BRA MAIN0
                     00368
0F66 8E     04DF     00369 MAIN6 LDX #$4DF
                     00370
0F69 A6     82       00371 MAIN7 LDA ,-X
0F6B A7     01       00372  STA 1,X
0F6D 9C     88       00373  CMPX <CURSOR
0F6F 22     F8       00374  BHI MAIN7
0F71 20     ED       00375  BRA MAIN5
                     00376
```

```
                     00377
                     00378
                     00379
                     00380
                     00381 *
                     00382 *** 8-BIT CALCULATOR
                     00383 *
                     00384
0F73 BD     1039     00385 CALC JSR FILBUF
0F76 86     3D       00386  LDA #'=
0F78 BD     10CD     00387  JSR CHROUT
0F7B 9E     00       00388  LDX <OFFSET
0F7D 9F     07       00389  STX <TEMP2
0F7F 86     07       00390  LDA #7
0F81 97     00       00391  STA <OFFSET
0F83 8D     06       00392  BSR CALC0
0F85 9E     07       00393  LDX <TEMP2
0F87 9F     00       00394  STX <OFFSET
0F89 20     C0       00395  BRA MAIN3
                     00396
0F8B 37     02       00397 CALC0 PULU A
0F8D BD     13F8     00398  JSR VALUE
0F90 D7     05       00399  STB <TEMP0
0F92 A6     5F       00400  LDA -1,U
0F94 2B     05       00401  BMI CALC1
0F96 27     15       00402  BEQ CALC2
0F98 7E     1441     00403  JMP BPARMS
                     00404
0F9B 97     06       00405 CALC1 STA <TEMP1
0F9D 37     02       00406  PULU A
0F9F BD     13F8     00407  JSR VALUE
0FA2 96     06       00408  LDA <TEMP1
0FA4 D7     06       00409  STB <TEMP1
```

T-Shirt, Tote Bag or Computer Clock

I ♥ my COLOR COMPUTER

Programmers Never Die — They Just Lose Their Memory

•T-SHIRTS/$5.00 ea. White Imprint Only

	SM	MED	LG	X LG
Red				
Blue				
Green				

I ♥ MY COLOR COMPUTER
Indicate how many of each size & color

	SM	MED	LG	X LG
Red				
Blue				
Green				

Programmers Never Die— They Just Lose Their Memory
Indicate how many of each size & color

Total Number of T-Shirts Ordered x $5.00 =__________

•TOTE BAGS/$4.00 ea. Natural Color Only, 14″ x 12″ with Brown Imprint — Indicate how many of each bag

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☐ **Programmers Never Die—They Just Lose Their Memory**

Total Number of Tote Bags Ordered x $4.00 =__________

•COMPUTER CLOCKS/$10.00 ea. Mini Computer with Keyboard LCD clock in a solid, Silver aluminum base. Clock displays time & date. Padded Base. Size: 1½″ 2″ x 2¼″ ☐ **How Many**

Total Number of Clocks Ordered x $10.00 =__________

Plus Shipping & Handling 1.50

Total Amount Due __________

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Acct. No. __________

Ex. Date ______ Signature __________

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Order Yours Today

```
0FA6 8D     23      00410   BSR CALC3
0FA8 0D     02      00411   TST <STOP
0FAA 27     01      00412   BEQ CALC2
0FAC 39             00413   RTS
                    00414
0FAD BD     16BF    00415 CALC2 JSR STORE
0FB0 DE     07      00416   LDU <TEMP2
0FB2 D7     00      00417   STB <OFFSET
0FB4 A6     84      00418   LDA ,X
0FB6 81     20      00419   CMPA #$20
0FB8 1026 0607      00420   LBNE PRINT
0FBC 30     01      00421   LEAX 1,X
0FBE A6     84      00422   LDA ,X
0FC0 81     20      00423   CMPA #$20
0FC2 1026 05FD      00424   LBNE PRINT
0FC6 30     01      00425   LEAX 1,X
0FC8 7E     15C3    00426   JMP PRINT
                    00427
0FCB D6     05      00428 CALC3 LDB <TEMP0
0FCD 4C             00429   INCA
0FCE 27     46      00430   BEQ ROR
0FD0 4C             00431   INCA
0FD1 27     36      00432   BEQ ROL
0FD3 4C             00433   INCA
0FD4 27     22      00434   BEQ DIVIDE
0FD6 4C             00435   INCA
0FD7 27     1B      00436   BEQ TIMES
0FD9 4C             00437   INCA
0FDA 27     15      00438   BEQ MINUS
0FDC 4C             00439   INCA
0FDD 27     0F      00440   BEQ PLUS
0FDF 4C             00441   INCA
0FE0 27     09      00442   BEQ XOR
```

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```
0FE2 4C             00443   INCA
0FE3 27     03      00444   BEQ OR
                    00445
                    00446 *** LOGICAL ARITHMETIC
0FE5 D4     06      00447 AND ANDB <TEMP1
0FE7 39             00448   RTS
                    00449
0FE8 DA     06      00450 OR ORB <TEMP1
0FEA 39             00451   RTS
                    00452
0FEB D8     06      00453 XOR EORB <TEMP1
0FED 39             00454   RTS
                    00455
0FEE DB     06      00456 PLUS ADDB <TEMP1
0FF0 39             00457   RTS
                    00458
0FF1 D0     06      00459 MINUS SUBB <TEMP1
0FF3 39             00460   RTS
                    00461
0FF4 96     06      00462 TIMES LDA <TEMP1
0FF6 3D             00463   MUL
0FF7 39             00464   RTS
                    00465
0FF8 0D     06      00466 DIVIDE TST <TEMP1
0FFA 1027 0443      00467   LBEQ BPARMS
0FFE 1F     98      00468   TFR B,A
1000 5F             00469   CLRB
                    00470
1001 90     06      00471 DIV1 SUBA <TEMP1
1003 25     03      00472   BLO DIV2
1005 5C             00473   INCB
1006 20     F9      00474   BRA DIV1
                    00475
1008 39             00476 DIV2 RTS
                    00477
1009 96     06      00478 ROL LDA <TEMP1
100B 1027 0432      00479   LBEQ BPARMS
100F 1C     FE      00480   ANDCC #$FE
                    00481
1011 59             00482 ROL1 ROLB
1012 4A             00483   DECA
1013 26     FC      00484   BNE ROL1
1015 39             00485   RTS
                    00486
1016 96     06      00487 ROR LDA <TEMP1
1018 1027 0425      00488   LBEQ BPARMS
101C 1C     FE      00489   ANDCC #$FE
                    00490
101E 56             00491 ROR1 RORB
101F 4A             00492   DECA
1020 26     FC      00493   BNE ROR1
1022 39             00494   RTS
                    00495
                    00496 *
                    00497 *** COMMON SUBROUTINES
                    00498 *
                    00499
1023 A6     80      00500 OK LDA ,X+
1025 81     FA      00501   CMPA #$FA
1027 27     FA      00502   BEQ OK
1029 81     FB      00503   CMPA #$FB
102B 27     F6      00504   BEQ OK
102D 81     F9      00505   CMPA #$F9
102F 27     F2      00506   BEQ OK
1031 4D             00507   TSTA
1032 102B 040B      00508   LBMI BPARMS
1036 26     EB      00509   BNE OK
1038 39             00510   RTS
                    00511
```

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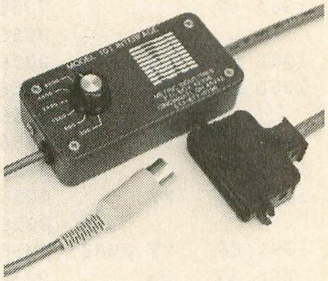
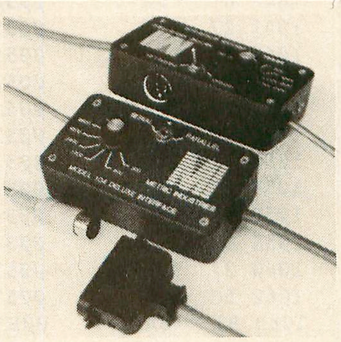
The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). The 101 is only 4" × 2" × 1" and comes with all cables and connectors for your computer and printer.



Model 104 Deluxe Interface $51.95

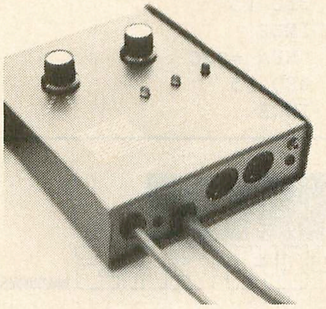
NEW

The Model 104 is a serial to parallel interface like the Model 101 but it has the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5" × 2.5" × 1.25" and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.



Model 103 Combo $68.95

With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, and many more.



IMPORTANT!

THE 101, 103 AND 104 ALL REQUIRE POWER IN ORDER TO OPERATE. MOST PRINTERS CAN SUPPLY POWER TO YOUR INTERFACE. STAR, RADIO SHACK, AND OKIDATA ARE JUST A FEW THAT DO. EPSON DOES NOT. THE INTERFACES CAN ALSO BE POWERED BY AN AC ADAPTER (RADIO SHACK MODEL 273-1431 PLUGS INTO ALL MODELS). IF YOU REQUIRE A POWER SUPPLY, ADD A "P" TO THE MODEL NUMBER AND $5.00 TO THE PRICE. (MODEL 101P $44.95, MODEL 104P $56.95 AND MODEL 103P $73.95)

Model 102 Switcher $35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.

The Model 101, 102, 103 and 104 will work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101, 103 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Ioth and many others. They support BASIC print commands, word processors and graphic commands.

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```
1039 8E     04C1      00512 FILBUF LDX #$4C1
103C 0F     02        00513  CLR <STOP
103E CE     0014      00514  LDU #INPBUF
                      00515
1041 A6     80        00516 F1 LDA ,X+
1043 5F               00517  CLRB
1044 81     6C        00518  CMPA #$6C ","
1046 27     42        00519  BEQ F3
1048 C6     F7        00520  LDB #$F7
104A 81     66        00521  CMPA #$66
104C 27     41        00522  BEQ F5
104E 5C               00523  INCB
104F 81     6E        00524  CMPA #$6E
1051 27     3C        00525  BEQ F5
1053 5C               00526  INCB
1054 81     7A        00527  CMPA #$7A
1056 27     37        00528  BEQ F5
1058 5C               00529  INCB
1059 81     6B        00530  CMPA #$6B
105B 27     32        00531  BEQ F5
105D 5C               00532  INCB
105E 81     6D        00533  CMPA #$6D
1060 27     2D        00534  BEQ F5
1062 5C               00535  INCB
1063 81     6A        00536  CMPA #$6A
1065 27     28        00537  BEQ F5
1067 5C               00538  INCB
1068 81     6F        00539  CMPA #$6F
106A 27     23        00540  BEQ F5
106C 5C               00541  INCB
106D 81     7C        00542  CMPA #$7C
106F 27     1E        00543  BEQ F5
1071 5C               00544  INCB
1072 81     7E        00545  CMPA #$7E
1074 27     19        00546  BEQ F5
1076 5C               00547  INCB
                      00548
1077 81     60        00549 F2 CMPA #$60
1079 26     10        00550  BNE F4
107B 8C     04DF      00551  CMPX #$4DF
107E 25     C1        00552  BLO F1
1080 6F     C4        00553  CLR ,U
1082 6F     41        00554  CLR 1,U
1084 6F     42        00555  CLR 2,U
1086 CE     0014      00556  LDU #INPBUF
1089 39               00557  RTS
                      00558
108A 4F               00559 F3 CLRA
                      00560
108B ED     C0        00561 F4 STD ,U+
108D 20     B2        00562  BRA F1
                      00563
108F 1F     98        00564 F5 TFR B,A
1091 5F               00565  CLRB
1092 20     F7        00566  BRA F4
                      00567
1094 E6     9F 0088   00568 GETKEY LDB [CURSOR]
1098 34     04        00569  PSHS B
109A E6     9F 0000   00570  LDB [OFFSET]
109E 34     04        00571  PSHS B
10A0 5F               00572  CLRB
                      00573
10A1 A6     9F 0088   00574 GETK1 LDA [CURSOR]
10A5 88     40        00575  EORA #$40
10A7 A7     9F 0088   00576  STA [CURSOR]
10AB A6     9F 0000   00577  LDA [OFFSET]
```

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```
10AF 88    40        00578  EORA #$40
10B1 A7    9F 0000   00579  STA [OFFSET]
                     00580
10B5 AD    9F A000   00581 GETK2 JSR [POLCAT]
10B9 26    05        00582  BNE GETK3
10BB 5A              00583  DECB
10BC 26    F7        00584  BNE GETK2
10BE 20    E1        00585  BRA GETK1
                     00586
10C0 35    04        00587 GETK3 PULS B
10C2 E7    9F 0000   00588  STB [OFFSET]
10C6 35    04        00589  PULS B
10C8 E7    9F 0088   00590  STB [CURSOR]
10CC 39              00591  RTS
                     00592
10CD 34    16        00593 CHROUT PSHS X,B,A
10CF 9E    88        00594  LDX <CURSOR
10D1 81    08        00595  CMPA #8
10D3 26    09        00596  BNE CHR1
10D5 8C    04C1      00597  CMPX #$4C1
10D8 27    4C        00598  BEQ CHR9
10DA 30    1F        00599  LEAX -1,X
10DC 20    29        00600  BRA CHR6
                     00601
10DE 81    0D        00602 CHR1 CMPA #$0D
10E0 26    0C        00603  BNE CHR3
                     00604
10E2 86    60        00605 CHR2 LDA #$60
10E4 A7    80        00606  STA ,X+
10E6 1F    10        00607  TFR X,D
10E8 C5    1F        00608  BITB #$1F
10EA 26    F6        00609  BNE CHR2
10EC 20    19        00610  BRA CHR6
```

```
                     00611
10EE 81    09        00612 CHR3 CMPA #9
10F0 27    36        00613  BEQ CHR10
10F2 81    20        00614  CMPA #$20
10F4 25    30        00615  BLO CHR9
10F6 4D              00616  TSTA
10F7 2B    0C        00617  BMI CHR5
10F9 81    40        00618  CMPA #$40
10FB 25    06        00619  BLO CHR4
10FD 81    60        00620  CMPA #$60
10FF 25    04        00621  BLO CHR5
1101 84    DF        00622  ANDA #$DF
                     00623
1103 88    40        00624 CHR4 EORA #$40
                     00625
1105 A7    80        00626 CHR5 STA ,X+
                     00627
1107 9F    88        00628 CHR6 STX <CURSOR
1109 8C    04DF      00629  CMPX #$4DF
110C 23    18        00630  BLS CHR9
110E 8E    0460      00631  LDX #$460
                     00632
1111 EC    88 20     00633 CHR7 LDD $20,X
1114 ED    81        00634  STD ,X++
1116 8C    04C0      00635  CMPX #$4C0
1119 25    F6        00636  BLO CHR7
111B 9F    88        00637  STX <CURSOR
111D C6    60        00638  LDB #$60
                     00639
111F E7    80        00640 CHR8 STB ,X+
1121 8C    04DF      00641  CMPX #$4DF
1124 23    F9        00642  BLS CHR8
                     00643
```

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1126 35    96          00644 CHR9 PULS A,B,X,PC
                       00645
1128 30    01          00646 CHR10 LEAX 1,X
112A 8C    04DF        00647  CMPX #$4DF
112D 22    F7          00648  BHI CHR9
112F 20    D6          00649  BRA CHR6
                       00650
                       00651 *
                       00652 *** PARSER SUBROUTINES
                       00653 *
                       00654
1131 DF    05          00655 MATCH STU <TEMP0
1133 AE    22          00656  LDX 2,Y
1135 9F    07          00657  STX <TEMP2
1137 1A    50          00658  ORCC #$50
                       00659
1139 86    02          00660 M1 LDA #2
113B BD    1241        00661  JSR DOIO
113E 6D    26          00662  TST 6,Y
1140 26    43          00663  BNE M5
1142 8E    0500        00664  LDX #$500
                       00665
1145 DE    05          00666 M2 LDU <TEMP0
1147 34    10          00667  PSHS X
                       00668
1149 A6    C0          00669 M3 LDA ,U+
114B A1    80          00670  CMPA ,X+
114D 27    FA          00671  BEQ M3
114F 35    10          00672  PULS X
1151 4D                00673  TSTA
1152 26    0A          00674  BNE M4
1154 9F    00          00675  STX <OFFSET
1156 1C    AF          00676  ANDCC #$AF
1158 8E    180C        00677  LDX #FOUND
115B 7E    15C3        00678  JMP PRINT
                       00679
115E AD    9F A000     00680 M4 JSR [POLCAT]
1162 26    21          00681  BNE M5
1164 30    01          00682  LEAX 1,X
1166 8C    0600        00683  CMPX #$600
1169 25    DA          00684  BLO M2
116B CE    18AE        00685  LDU #END
116E BD    12B3        00686  JSR NEXT
1171 EC    22          00687  LDD 2,Y
1173 1093  07          00688  CMPD <TEMP2
1176 26    C1          00689  BNE M1
1178 86    02          00690  LDA #2
117A BD    1241        00691  JSR DOIO
117D 1C    AF          00692  ANDCC #$AF
117F 8E    17EA        00693  LDX #NOLUCK
1182 7E    15C3        00694  JMP PRINT
                       00695
1185 8E    17FA        00696 M5 LDX #ABORT
1188 1C    AF          00697  ANDCC #$AF
118A 7E    15C3        00698  JMP PRINT
                       00699
118D 37    02          00700 NUMB PULU A
118F BD    13F8        00701  JSR VALUE
1192 0D    02          00702  TST <STOP
1194 1026  01F0        00703  LBNE RET
1198 D7    01          00704  STB <OFFSET+1
119A 7E    1384        00705  JMP COMM
                       00706
119D 37    02          00707 THREE PULU A
119F BD    13F8        00708  JSR VALUE
11A2 D7    05          00709  STB <TEMP0
11A4 37    02          00710  PULU A
11A6 BD    13F8        00711  JSR VALUE
11A9 D7    06          00712  STB <TEMP1
11AB 37    02          00713  PULU A
11AD BD    13F8        00714  JSR VALUE
11B0 D7    07          00715  STB <TEMP2
11B2 8E    0500        00716  LDX #$500
11B5 1F    13          00717  TFR X,U
11B7 D6    05          00718  LDB <TEMP0
11B9 3A                00719  ABX
11BA D6    06          00720  LDB <TEMP1
11BC 4F                00721  CLRA
11BD 33    CB          00722  LEAU D,U
11BF 39                00723  RTS
                       00724
11C0 8C    0600        00725 MODUL CMPX #$600
11C3 25    06          00726  BLO MOD1
11C5 30    89 FF00     00727  LEAX -$100,X
11C9 20    F5          00728  BRA MODUL
                       00729
11CB 8C    0500        00730 MOD1 CMPX #$500
11CE 24    06          00731  BHS MOD2
11D0 30    89 0100     00732  LEAX $100,X
11D4 20    F5          00733  BRA MOD1
                       00734
11D6 1183  0600        00735 MOD2 CMPU #$600
11DA 25    06          00736  BLO MOD3
11DC 33    C9 FF00     00737  LEAU -$100,U
11E0 20    F4          00738  BRA MOD2
                       00739
11E2 1183  0500        00740 MOD3 CMPU #$500
11E6 24    06          00741  BHS MOD4
11E8 33    C9 0100     00742  LEAU $100,U
11EC 20    F4          00743  BRA MOD3
                       00744
11EE 39                00745 MOD4 RTS
                       00746
```

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- will do a directory displaying file names in two columns, the number of free granules, and the free bytes if below 65535; has a kill file command
- loads and saves, sectors, tracks or files; loads files two ways, as done by basic, or with header bytes left in, which helps in studying how files are saved on disk; has an append sector command
- verifies tracks or the entire disk showing the track and sector if an error occurs, with the option of continue or stop
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- has a rapid scan feature which allows you to scan the disk by tracks and sectors using the arrow keys
- will dump memory to the screen in ascii, good for listing basic programs or source files; has a move memory block command, and a transfer control command
- converts decimal to hex or hex to decimal
- allows you to examine memory using the arrow keys with displays in hex (or decimal) and ascii
- will load and execute rompac's saved on disk; has a move rom to ram command
- allows you to change origin (start addr.) of ML programs; displays the start, end, and execute addresses of ML programs
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- Add these features to your computer/program: ML extension of Basic loads on top of 16, 32, or 64K machines to enable easy mixture of **hi-res graphics and text** in your programs. Dense text or large lettering for children, visually impaired or VCR title screens with no programming!
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- Simple 2-letter abbreviated commands inside your program or **control key** entry from keyboard, even during program execution!
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- deals with missing end of file blocks; loads and saves data with or without a filename block
- handles programs with varying block lengths
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- converts ML programs into basic data statements which can be loaded as, or merged with, a basic program
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11EF 8D   AC      00747 SWAP BSR THREE
11F1 0D   02      00748  TST <STOP
11F3 1026 0191    00749  LBNE RET
                  00750
11F7 8D   C7      00751 SWAP1 BSR MODUL
11F9 A6   84      00752  LDA ,X
11FB E6   C4      00753  LDB ,U
11FD E7   80      00754  STB ,X+
11FF A7   C0      00755  STA ,U+
1201 0A   07      00756  DEC <TEMP2
1203 26   F2      00757  BNE SWAP1
1205 39           00758  RTS
                  00759
1206 8D   95      00760 COPY BSR THREE
1208 0D   02      00761  TST <STOP
120A 1026 017A    00762  LBNE RET
                  00763
120E 8D   B0      00764 COPY1 BSR MODUL
1210 A6   80      00765  LDA ,X+
1212 A7   C0      00766  STA ,U+
1214 0A   07      00767  DEC <TEMP2
1216 26   F6      00768  BNE COPY1
1218 39           00769  RTS
                  00770
1219 86   02      00771 READ LDA #2
121B E6   C0      00772  LDB ,U+
121D 27   22      00773  BEQ DOIO
                  00774
121F C1   F9      00775 GDRV CMPB #$F9 ":"
1221 1026 021C    00776  LBNE BPARMS
1225 37   04      00777  PULU B
1227 C0   70      00778  SUBB #$70
1229 25   10      00779  BLO BDRIVE
122B C1   03      00780  CMPB #3
122D 22   0C      00781  BHI BDRIVE
122F E7   21      00782  STB 1,Y
1231 20   0E      00783  BRA DOIO
                  00784
1233 86   03      00785 WRITE LDA #3
1235 E6   C0      00786  LDB ,U+
1237 26   E6      00787  BNE GDRV
1239 20   06      00788  BRA DOIO
                  00789
123B 8E   179F    00790 BDRIVE LDX #ERR3
123E 7E   15C3    00791  JMP PRINT
                  00792
                  00793 *
                  00794 *** DISK INPUT/OUTPUT
                  00795 *
                  00796
1241 A7   A4      00797 DOIO STA ,Y
                  00798
1243 8E   0500    00799 DOIO1 LDX #$500
1246 AF   24      00800  STX 4,Y
1248 9F   00      00801  STX <OFFSET
124A 4F           00802  CLRA
124B 1F   8B      00803  TFR A,DP
124D AD   9F C004 00804  JSR [DSKCON]
1251 C6   30      00805  LDB #$30
1253 F7   0985    00806  STB >DELAY
1256 A6   26      00807  LDA 6,Y
1258 26   01      00808  BNE DOIO2
125A 39           00809  RTS
                  00810
125B 8E   16E0    00811 DOIO2 LDX #IOERR
125E EA   21      00812  ORB 1,Y
1260 F7   16FB    00813  STB >DRVN
1263 34   02      00814  PSHS A
1265 BD   15C3    00815  JSR PRINT
1268 8E   16FE    00816  LDX #DNR
126B A6   E0      00817  LDA ,S+
126D 2B   09      00818  BMI DOIO3
126F 8E   1717    00819  LDX #WRP
1272 48           00820  LSLA
1273 2B   03      00821  BMI DOIO3
1275 8E   1735    00822  LDX #SYS
                  00823
1278 BD   15C3    00824 DOIO3 JSR PRINT
                  00825
127B 8E   174D    00826 DOIO4 LDX #OPT
127E BD   15C3    00827  JSR PRINT
1281 BD   1094    00828  JSR GETKEY
1284 BD   10CD    00829  JSR CHROUT
1287 81   52      00830  CMPA #'R
1289 27   B8      00831  BEQ DOIO1
128B 81   41      00832  CMPA #'A
128D 26   EC      00833  BNE DOIO4
128F 39           00834  RTS
                  00835
                  00836 *
                  00837 *** MORE PARSER ROUTINES
                  00838 *
                  00839
1290 37   02      00840 GRAN PULU A
1292 BD   13F8    00841  JSR VALUE
1295 0D   02      00842  TST <STOP
1297 1026 00ED    00843  LBNE RET
129B C1   43      00844  CMPB #MAXGRN
129D 1022 0066    00845  LBHI ILLREQ
12A1 4F           00846  CLRA
12A2 54           00847  LSRB
12A3 34   04      00848  PSHS B
12A5 89   00      00849  ADCA #0
```

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```
12A7 C6   09        00850  LDB #9
12A9 3D             00851  MUL
12AA 5C             00852  INCB
12AB 35   02        00853  PULS A
12AD 81   11        00854  CMPA #17
12AF 82   FF        00855  SBCA #$FF
12B1 20   0F        00856  BRA NEXT1
                    00857
12B3 EC   22        00858 NEXT LDD 2,Y
12B5 5C             00859  INCB
12B6 C1   12        00860  CMPB #MAXSCT
12B8 23   08        00861  BLS NEXT1
12BA C6   01        00862  LDB #1
12BC 4C             00863  INCA
12BD 81   22        00864  CMPA #MAXTRK
12BF 23   01        00865  BLS NEXT1
12C1 4F             00866  CLRA
                    00867
12C2 ED   22        00868 NEXT1 STD 2,Y
12C4 BD   1548      00869  JSR DISP
12C7 7E   1384      00870  JMP COMM
                    00871
12CA EC   22        00872 PREV LDD 2,Y
12CC 5A             00873  DECB
12CD 26   F3        00874  BNE NEXT1
12CF C6   12        00875  LDB #MAXSCT
12D1 4A             00876  DECA
12D2 2A   EE        00877  BPL NEXT1
12D4 86   22        00878  LDA #MAXTRK
12D6 20   EA        00879  BRA NEXT1
                    00880
12D8 37   02        00881 FILL PULU A
12DA 81   41        00882  CMPA #'A
12DC 27   29        00883  BEQ ILLREQ
12DE 81   67        00884  CMPA #$67 "'"
12E0 27   25        00885  BEQ ILLREQ
12E2 BD   13F8      00886  JSR VALUE
12E5 0D   02        00887  TST <STOP
12E7 1026 009D      00888  LBNE RET
12EB D7   05        00889  STB <TEMP0
12ED 37   02        00890  PULU A
12EF BD   13F8      00891  JSR VALUE
12F2 96   05        00892  LDA <TEMP0
12F4 5D             00893  TSTB
12F5 26   05        00894  BNE FILL1
12F7 8E   0500      00895  LDX #$500
12FA 9F   00        00896  STX <OFFSET
                    00897
12FC A7   9F 0000   00898 FILL1 STA [OFFSET]
1300 0C   01        00899  INC <OFFSET+1
1302 5A             00900  DECB
1303 26   F7        00901  BNE FILL1
1305 20   7D        00902  BRA COMM
                    00903
1307 8E   177A      00904 ILLREQ LDX #ERR1
130A 0C   02        00905  INC <STOP
130C BD   15C3      00906  JSR PRINT
130F 20   73        00907  BRA COMM
                    00908
1311 37   02        00909 TRACK PULU A
1313 BD   13F8      00910  JSR VALUE
1316 0D   02        00911  TST <STOP
1318 26   6E        00912  BNE RET
131A C1   22        00913  CMPB #MAXTRK
131C 22   E9        00914  BHI ILLREQ
131E E7   22        00915  STB 2,Y
1320 20   62        00916  BRA COMM
                    00917
1322 37   02        00918 SECTOR PULU A
1324 BD   13F8      00919  JSR VALUE
1327 0D   02        00920  TST <STOP
1329 26   5D        00921  BNE RET
132B C1   12        00922  CMPB #MAXSCT
132D 22   D8        00923  BHI ILLREQ
132F 5D             00924  TSTB
1330 27   D5        00925  BEQ ILLREQ
1332 E7   23        00926  STB 3,Y
1334 20   4E        00927  BRA COMM
                    00928
1336 8E   0004      00929 INP LDX #IN
1339 20   05        00930  BRA SET
                    00931
133B 8E   0003      00932 OUTPUT LDX #OUT
133E 20   00        00933  BRA SET
                    00934
1340 37   06        00935 SET PULU D
1342 5D             00936  TSTB
1343 26   2F        00937  BNE BRAD
1345 81   41        00938  CMPA #'A
1347 27   18        00939  BEQ OUTP1
1349 81   67        00940  CMPA #$67 "'"
134B 27   1B        00941  BEQ SYNA
134D 81   42        00942  CMPA #'B
134F 27   10        00943  BEQ OUTP1
1351 81   65        00944  CMPA #$65 "%"
1353 27   17        00945  BEQ SYNB
1355 81   48        00946  CMPA #'H
1357 27   08        00947  BEQ OUTP1
1359 81   64        00948  CMPA #$64 "$"
135B 27   13        00949  BEQ SYNH
135D 81   44        00950  CMPA #'D
135F 26   13        00951  BNE BRAD
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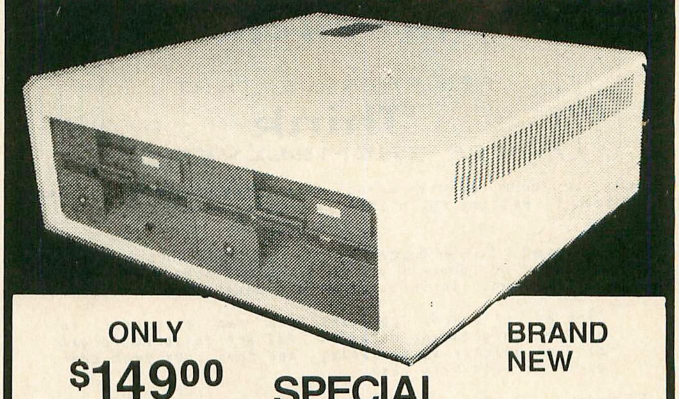

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```
                 00952
1361 A7    84    00953 OUTP1 STA ,X
1363 BD    1548  00954  JSR DISP
1366 20    1C    00955  BRA COMM
                 00956
                 00957
1368 86    41    00958 SYNA LDA #'A
136A 20    F5    00959  BRA OUTP1
136C 86    42    00960 SYNB LDA #'B
136E 20    F1    00961  BRA OUTP1
1370 86    48    00962 SYNH LDA #'H
1372 20    ED    00963  BRA OUTP1
1374 8E    17DB  00964 BRAD LDX #ERR6
1377 0C    02    00965  INC <STOP
1379 7E    15C3  00966  JMP PRINT
                 00967
137C 8E    178B  00968 UNKNOW LDX #ERR2
137F 0C    02    00969  INC <STOP
1381 7E    15C3  00970  JMP PRINT
                 00971
                 00972 *
                 00973 *** COMMAND PARSER
                 00974 *
                 00975
1384 A6    C0    00976 COMM LDA ,U+
1386 26    01    00977  BNE COMM0
                 00978
1388 39          00979 RET RTS
                 00980
1389 81    51    00981 COMM0 CMPA #'Q
138B 26    03    00982  BNE COMM1
138D 32    62    00983  LEAS 2,S
138F 39          00984  RTS
```

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                 00985
1390 81    52    00986 COMM1 CMPA #'R
1392 1027 FE83   00987  LBEQ READ
1396 81    57    00988  CMPA #'W
1398 1027 FE97   00989  LBEQ WRITE
139C 81    4F    00990  CMPA #'O
139E 1027 FF99   00991  LBEQ OUTPUT
13A2 81    49    00992  CMPA #'I
13A4 1027 FF8E   00993  LBEQ INP
13A8 81    43    00994  CMPA #'C
13AA 1027 FE58   00995  LBEQ COPY
13AE 81    4D    00996  CMPA #'M
13B0 1027 FD7D   00997  LBEQ MATCH
13B4 81    4E    00998  CMPA #'N
13B6 1027 FDD3   00999  LBEQ NUMB
13BA 81    58    01000  CMPA #'X
13BC 1027 FE2F   01001  LBEQ SWAP
13C0 81    FA    01002  CMPA #$FA "+"
13C2 1027 FEED   01003  LBEQ NEXT
13C6 81    FB    01004  CMPA #$FB "-"
13C8 1027 FEFE   01005  LBEQ PREV
13CC 81    54    01006  CMPA #'T
13CE 1027 FF3F   01007  LBEQ TRACK
13D2 81    53    01008  CMPA #'S
13D4 1027 FF4A   01009  LBEQ SECTOR
13D8 81    47    01010  CMPA #'G
13DA 1027 FEB2   01011  LBEQ GRAN
13DE 81    46    01012  CMPA #'F
13E0 1027 FEF4   01013  LBEQ FILL
13E4 81    50    01014  CMPA #'P
13E6 1027 0211   01015  LBEQ LP
                 01016
13EA 8D    0C    01017  BSR VALUE
13EC 0D    02    01018  TST <STOP
13EE 26    98    01019  BNE RET
13F0 E7    9F 0000 01020  STB [OFFSET]
13F4 0C    01    01021  INC <OFFSET+1
13F6 20    8C    01022  BRA COMM
                 01023
                 01024 *
                 01025 *** INPUT CONVERSIONS
                 01026 *
                 01027
13F8 81    48    01028 VALUE CMPA #'H
13FA 1027 0083   01029  LBEQ HV
13FE 81    64    01030  CMPA #$64 "$"
1400 27    7F    01031  BEQ HV
1402 81    42    01032  CMPA #'B
1404 27    43    01033  BEQ BV
1406 81    65    01034  CMPA #$65 "%"
1408 27    3F    01035  BEQ BV
140A 81    44    01036  CMPA #'D
140C 27    52    01037  BEQ DV
140E 81    41    01038  CMPA #'A
1410 1027 0097   01039  LBEQ AV
1414 81    67    01040  CMPA #$67 "'"
1416 1027 0091   01041  LBEQ AV
141A A6    C2    01042  LDA ,-U
141C 81    70    01043  CMPA #$70
141E 25    17    01044  BLO VALUE1
1420 D6    04    01045  LDB <IN
1422 C1    41    01046  CMPB #'A
1424 1027 0083   01047  LBEQ AV
1428 C1    42    01048  CMPB #'B
142A 1027 001B   01049  LBEQ BV
142E C1    44    01050  CMPB #'D
1430 1027 002C   01051  LBEQ DV
1434 7E    1481  01052  JMP HV
                 01053
1437 32    62    01054 VALUE1 LEAS 2,S
```

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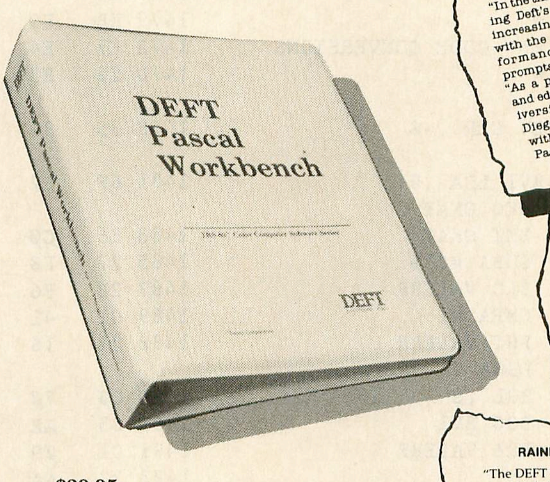

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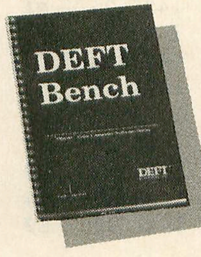

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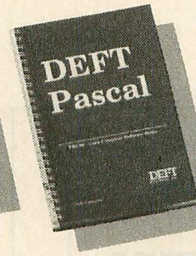

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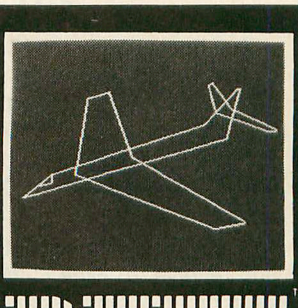

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```
1439 4D           01055  TSTA
143A 27  05       01056  BEQ BPARMS
143C 7E  137C     01057  JMP UNKNOW
                  01058
143F 32  61       01059 VALERR LEAS 1,S
                  01060
1441 0C  02       01061 BPARMS INC <STOP
1443 8E  1766     01062  LDX #ERR0
1446 7E  15C3     01063  JMP PRINT
                  01064
                  01065 *
                  01066 *** CODE CONVERSIONS
                  01067 *
                  01068
1449 6F  E2       01069 BV CLR ,-S
                  01070
144B A6  C0       01071 BV1 LDA ,U+
144D 27  30       01072  BEQ OKAY
144F 2B  2E       01073  BMI OKAY
1451 80  70       01074  SUBA #$70
1453 25  EA       01075  BLO VALERR
1455 81  01       01076  CMPA #1
1457 22  E6       01077  BHI VALERR
1459 44           01078  LSRA
145A 69  E4       01079  ROL ,S
145C 24  ED       01080  BCC BV1
145E 20  DF       01081  BRA VALERR
                  01082
1460 6F  E2       01083 DV CLR ,-S
                  01084
1462 E6  C0       01085 DV1 LDB ,U+
1464 27  19       01086  BEQ OKAY
1466 2B  17       01087  BMI OKAY
1468 C0  70       01088  SUBB #$70
146A 25  D3       01089  BLO VALERR
146C C1  09       01090  CMPB #9
146E 22  CF       01091  BHI VALERR
1470 34  04       01092  PSHS B
1472 E6  61       01093  LDB 1,S
1474 58           01094  LSLB
1475 58           01095  LSLB
1476 EB  61       01096  ADDB 1,S
1478 58           01097  LSLB
1479 EB  E0       01098  ADDB ,S+
147B E7  E4       01099  STB ,S
147D 20  E3       01100  BRA DV1
                  01101
147F 35  84       01102 OKAY PULS B,PC
                  01103
1481 6F  E2       01104 HV CLR ,-S
                  01105
1483 E6  C0       01106 HV1 LDB ,U+
1485 27  F8       01107  BEQ OKAY
1487 2B  F6       01108  BMI OKAY
1489 C1  41       01109  CMPB #'A
148B 24  16       01110  BHS HV3
                  01111
148D C0  70       01112 HV0 SUBB #$70
148F 25  AE       01113  BLO VALERR
1491 C1  09       01114  CMPB #9
1493 22  AA       01115  BHI VALERR
                  01116
1495 34  04       01117 HV2 PSHS B
1497 E6  61       01118  LDB 1,S
1499 58           01119  LSLB
149A 58           01120  LSLB
149B 58           01121  LSLB
149C 58           01122  LSLB
149D EA  E0       01123  ORB ,S+
149F E7  E4       01124  STB ,S
14A1 20  E0       01125  BRA HV1
                  01126
14A3 C1  46       01127 HV3 CMPB #'F
14A5 22  E6       01128  BHI HV0
14A7 C0  37       01129  SUBB #$37
14A9 20  EA       01130  BRA HV2
                  01131
14AB A6  C0       01132 AV LDA ,U+
14AD 27  18       01133  BEQ AV3
14AF 2B  16       01134  BMI AV3
14B1 81  40       01135  CMPA #$40
14B3 22  04       01136  BHI AV1
14B5 8B  40       01137  ADDA #$40
14B7 20  06       01138  BRA AV2
                  01139
14B9 81  60       01140 AV1 CMPA #$60
14BB 25  02       01141  BLO AV2
14BD 80  40       01142  SUBA #$40
                  01143
14BF A7  9F 0000  01144 AV2 STA [OFFSET]
14C3 0C  01       01145  INC <OFFSET+1
14C5 20  E4       01146  BRA AV
                  01147
14C7 0A  01       01148 AV3 DEC <OFFSET+1
14C9 E6  9F 0000  01149  LDB [OFFSET]
14CD 39           01150  RTS
                  01151
                  01152 *
                  01153 *** OUTPUT CONVERSIONS
                  01154 *
                  01155
14CE 34  04       01156 CONVA PSHS B
14D0 86  3F       01157  LDA #'?
```

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14D2 C4    7F        01158  ANDB #$7F
14D4 C1    20        01159  CMPB #$20
14D6 24    02        01160  BHS CONVA1
14D8 1F    89        01161  TFR A,B
                     01162
14DA E7    84        01163 CONVA1 STB ,X
14DC 35    84        01164  PULS B,PC
                     01165
14DE 96    03        01166 CONV LDA <OUT
14E0 81    44        01167  CMPA #'D
14E2 27    33        01168  BEQ CONVD
                     01169
14E4 34    04        01170 CONVH PSHS B
14E6 86    20        01171  LDA #$20
14E8 A7    84        01172  STA ,X
14EA A6    E4        01173  LDA ,S
14EC 44              01174  LSRA
14ED 44              01175  LSRA
14EE 44              01176  LSRA
14EF 44              01177  LSRA
14F0 8B    90        01178  ADDA #$90
14F2 19              01179  DAA
14F3 89    40        01180  ADCA #$40
14F5 19              01181  DAA
14F6 A7    01        01182  STA 1,X
14F8 A6    E4        01183  LDA ,S
14FA 84    0F        01184  ANDA #$0F
14FC 8B    90        01185  ADDA #$90
14FE 19              01186  DAA
14FF 89    40        01187  ADCA #$40
1501 19              01188  DAA
1502 A7    02        01189  STA 2,X
1504 35    84        01190  PULS B,PC
```

```
                     01191
1506 34    14        01192 CONVB PSHS B,X
1508 C6    08        01193  LDB #8
                     01194
150A 86    30        01195 CONVB1 LDA #$30
150C 68    E4        01196  LSL ,S
150E 89    00        01197  ADCA #0
                     01198
1510 A7    80        01199 CONVB2 STA ,X+
1512 5A              01200  DECB
1513 26    F5        01201  BNE CONVB1
1515 35    94        01202  PULS B,X,PC
                     01203
1517 1F    98        01204 CONVD TFR B,A
1519 34    06        01205  PSHS D
151B 86    30        01206  LDA #$30
151D A7    84        01207  STA ,X
151F A7    01        01208  STA 1,X
                     01209
1521 C0    64        01210 CONVD1 SUBB #$64
1523 25    06        01211  BLO CONVD2
                     01212
1525 E7    E4        01213  STB ,S
1527 6C    84        01214  INC ,X
1529 20    F6        01215  BRA CONVD1
                     01216
152B E6    E4        01217 CONVD2 LDB ,S
                     01218
152D C0    0A        01219 CONVD3 SUBB #$0A
152F 25    06        01220  BLO CONVD4
1531 E7    E4        01221  STB ,S
1533 6C    01        01222  INC 1,X
1535 20    F6        01223  BRA CONVD3
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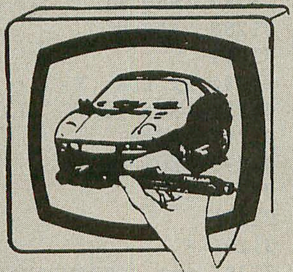

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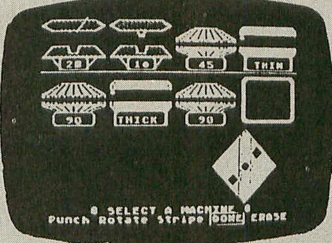

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```
                      01224
1537 35     06        01225 CONVD4 PULS D
1539 8A     30        01226  ORA #$30
153B A7     02        01227  STA 2,X
153D A6     84        01228  LDA ,X
153F 81     30        01229  CMPA #$30
1541 26     04        01230  BNE CVD5
1543 86     20        01231  LDA #$20
1545 A7     84        01232  STA ,X
                      01233
1547 39               01234 CVD5 RTS
                      01235
                      01236 *
                      01237 *** KEYLINE GENERATOR
                      01238 *
                      01239
1548 9E     88        01240 DISP LDX <CURSOR
154A 34     57        01241  PSHS U,X,B,A,CC
154C 1A     50        01242  ORCC #$50
154E CE     1819      01243  LDU #FORM
1551 30     C8 21     01244  LEAX $21,U
1554 E6     22        01245  LDB 2,Y
1556 BD     14DE      01246  JSR CONV
1559 30     C8 25     01247  LEAX $25,U
155C E6     23        01248  LDB 3,Y
155E BD     14DE      01249  JSR CONV
1561 D6     01        01250  LDB <OFFSET+1
1563 30     C8 29     01251  LEAX $29,U
1566 BD     14DE      01252  JSR CONV
1569 E6     9F 0000   01253  LDB [OFFSET]
156D 30     C8 2D     01254  LEAX $2D,U
1570 BD     14E4      01255  JSR CONVH
1573 30     C8 31     01256  LEAX $31,U
1576 BD     1517      01257  JSR CONVD
1579 30     C8 35     01258  LEAX $35,U
157C BD     14CE      01259  JSR CONVA
157F 30     C8 37     01260  LEAX $37,U
1582 BD     1506      01261  JSR CONVB
1585 CE     187D      01262  LDU #FORM1+$14
1588 96     04        01263  LDA <IN
158A 8D     1B        01264  BSR RADIX
158C CE     1886      01265  LDU #FORM1+$1D
158F 96     03        01266  LDA <OUT
1591 8D     14        01267  BSR RADIX
1593 8E     0400      01268  LDX #$400
1596 9F     88        01269  STX <CURSOR
1598 8E     1869      01270  LDX #FORM1
159B 8D     26        01271  BSR PRINT
159D 8E     1819      01272  LDX #FORM
15A0 8D     21        01273  BSR PRINT
15A2 35     57        01274  PULS CC,A,B,X,U
15A4 9F     88        01275  STX <CURSOR
15A6 39               01276  RTS
                      01277
15A7 8E     18B4      01278 RADIX LDX #RADS
15AA C6     03        01279  LDB #3
15AC 81     41        01280  CMPA #'A
15AE 27     0B        01281  BEQ R1
15B0 3A               01282  ABX
15B1 81     42        01283  CMPA #'B
15B3 27     06        01284  BEQ R1
15B5 3A               01285  ABX
15B6 81     44        01286  CMPA #'D
15B8 27     01        01287  BEQ R1
15BA 3A               01288  ABX
                      01289
15BB A6     80        01290 R1 LDA ,X+
15BD A7     C0        01291  STA ,U+
15BF 5A               01292  DECB
15C0 26     F9        01293  BNE R1
15C2 39               01294  RTS
                      01295
                      01296 *
                      01297 *** PERIPHERIAL OUTPUT
                      01298 *
                      01299
15C3 A6     80        01300 PRINT LDA ,X+
15C5 BD     10CD      01301  JSR CHROUT
15C8 4D               01302  TSTA
15C9 26     F8        01303  BNE PRINT
15CB 39               01304  RTS
                      01305
15CC A6     80        01306 LPRINT LDA ,X+
15CE 27     04        01307  BEQ LPR0
15D0 8D     19        01308  BSR LPT
15D2 20     F8        01309  BRA LPRINT
                      01310
15D4 0D     06        01311 LPR0 TST <TEMP1
15D6 27     12        01312  BEQ LPR1
15D8 D6     03        01313  LDB <OUT
15DA C1     41        01314  CMPB #'A
15DC 27     0C        01315  BEQ LPR1
15DE 86     20        01316  LDA #$20
15E0 BD     A2BF      01317  JSR >ROMLPT
15E3 C1     42        01318  CMPB #'B
15E5 26     03        01319  BNE LPR1
15E7 BD     A2BF      01320  JSR >ROMLPT
                      01321
15EA 39               01322 LPR1 RTS
                      01323
15EB 81     0D        01324 LPT CMPA #$0D
15ED 26     09        01325  BNE LPT1
```

ADOS ENHANCED, EPROM-ABLE DISK BASIC

Now, you can supercharge Basic with an impressive array of extra features WITHOUT sacrificing compatibility! ADOS is compatible with virtually 100% of commercial software. Customizing utilities are provided to allow user-defined command abbreviations, baud rate, step rate, tracks per disk (35 or 40), support of double-sided drives, and more. After customizing ADOS, you can have it burned into an EPROM that plugs into the Disk Basic ROM socket, or just use it in RAM as a 64K disk utility. (EPROM + burning will cost about $20--we provide information concerning how you can have this done.) Features include: • repeat and edit of the last direct-mode command • 26 definable control-key abbreviations • automatic line-number prompts • DOS command • lowercase command entry (a fine complement to a Lowerkit or PBJ WordPak) • COPY (filename) to (drive number) • AE error override option • RAM command (64K) • RUNM command • text echoing to printer • ML monitor • text file scan • enhanced directory • error trapping • hi-res text utility included (42, 51, or 64 characters per line)

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☐ Basic
☐ Extended Basic
☐ 16K Memory
☐ 64K Memory
☐ Monitor
☐ Multipack
☐ Disk
☐ Modem
☐ Printer
☐ 80 Column Board
☐ Other ____________

What hardware products you plan to buy this year?

☐ More Memory
☐ Modem
☐ Disk Drives
☐ Coco Max
☐ Printer
☐ Other ____________

What software products are you interested in?

☐ Business
☐ Music and Sound
☐ Communication
☐ Graphics
☐ Utilities
☐ Home and Family
☐ Other ____________

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```
15EF BD     A2BF    01326  JSR >ROMLPT
15F2 B6     18C0    01327  LDA >LFEED
15F5 26     01      01328  BNE LPT1
15F7 39             01329  RTS
                    01330
15F8 7E     A2BF    01331 LPT1 JMP >ROMLPT
                    01332
                    01333 *** PRINTER DUMP & BAUD
15FB A6     C0      01334 LP LDA ,U+
15FD 27     67      01335  BEQ LP0
15FF BD     13F8    01336  JSR VALUE
1602 DF     05      01337  STU <TEMP0
1604 8E     17C8    01338  LDX #ERR5
1607 CE     01CA    01339  LDU #$1CA
160A C1     01      01340  CMPB #1
160C 27     25      01341  BEQ LPB
160E CE     00BE    01342  LDU #$BE
1611 C1     03      01343  CMPB #3
1613 27     1E      01344  BEQ LPB
1615 CE     0057    01345  LDU #$57
1618 C1     06      01346  CMPB #6
161A 27     17      01347  BEQ LPB
161C CE     0029    01348  LDU #$29
161F C1     0C      01349  CMPB #12
1621 27     10      01350  BEQ LPB
1623 CE     0012    01351  LDU #$12
1626 C1     18      01352  CMPB #24
1628 27     09      01353  BEQ LPB
162A CE     0001    01354  LDU #1
162D C1     60      01355  CMPB #96
162F 1026   FF90    01356  LBNE PRINT
                    01357
1633 DF     95      01358 LPB STU <BAUD
```

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Distributed in Australia by Computer Hut Software, 21 Williams Street, Bowen, QLD 4804, (077) 86-2220. Dealer and Author inquiries welcome.

```
1635 DE     05      01359  LDU <TEMP0
1637 7E     1384    01360  JMP COMM
                    01361
163A F6     FF22    01362 READY LDB >STATUS
163D 54             01363  LSRB
163E 24     08      01364  BCC LP01
1640 8E     17B5    01365  LDX #ERR4
1643 32     62      01366  LEAS 2,S
1645 7E     15C3    01367  JMP PRINT
                    01368
1648 39             01369 LP01 RTS
                    01370
1649 0F     05      01371 LP1B CLR <TEMP0
164B 0F     06      01372  CLR <TEMP1
164D 8E     1899    01373  LDX #FMT
1650 E6     22      01374  LDB 2,Y
1652 BD     14DE    01375  JSR CONV
1655 8E     18A6    01376  LDX #FMS
1658 E6     23      01377  LDB 3,Y
165A BD     14DE    01378  JSR CONV
165D 8E     1859    01379  LDX #FORM0
1660 BD     15CC    01380  JSR LPRINT
1663 7E     15CC    01381  JMP LPRINT
                    01382
1666 8D     D2      01383 LP0 BSR READY
1668 8D     DF      01384  BSR LP1B
166A 0C     06      01385  INC <TEMP1
166C CE     0500    01386  LDU #$500
                    01387
166F AD     9F A000 01388 LP1 JSR [POLCAT]
1673 26     43      01389  BNE LP4
1675 37     04      01390  PULU B
1677 8D     46      01391  BSR STORE
1679 BD     15CC    01392  JSR LPRINT
167C 96     03      01393  LDA <OUT
167E 81     41      01394  CMPA #'A
1680 27     08      01395  BEQ LONG
1682 1F     30      01396  TFR U,D
1684 C5     0F      01397  BITB #$0F
1686 26     25      01398  BNE LP2
1688 20     15      01399  BRA LFCR
                    01400
168A 1F     30      01401 LONG TFR U,D
168C C5     3F      01402  BITB #$3F
168E 27     0F      01403  BEQ LFCR
1690 C5     1F      01404  BITB #$1F
1692 26     19      01405  BNE LP2
1694 CC     2006    01406  LDD #$2006
                    01407
1697 BD     A2BF    01408 LONG1 JSR >ROMLPT
169A 5A             01409  DECB
169B 26     FA      01410  BNE LONG1
169D 20     0E      01411  BRA LP2
                    01412
169F 8D     12      01413 LFCR BSR LP3
16A1 0C     05      01414  INC <TEMP0
16A3 96     05      01415  LDA <TEMP0
16A5 81     04      01416  CMPA #4
16A7 25     04      01417  BLO LP2
16A9 0F     05      01418  CLR <TEMP0
16AB 8D     06      01419  BSR LP3
                    01420
16AD 1183   0600    01421 LP2 CMPU #$600
16B1 25     BC      01422  BLO LP1
                    01423
16B3 86     0D      01424 LP3 LDA #$0D
16B5 7E     15EB    01425  JMP LPT
                    01426
16B8 8D     F9      01427 LP4 BSR LP3
16BA 8D     F7      01428  BSR LP3
```

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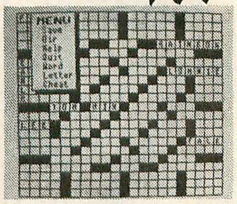

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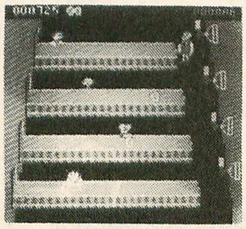

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Move along the end of the bars serving beer to your thirsty customers. Watch for falling glasses and rowdy customers. Loads of fun.

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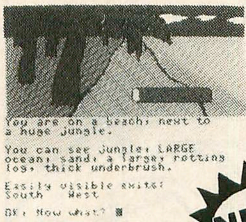

```
You are on a beach, next to
a huge jungle.

You can see Jungle, LARGE
ocean, sand, a large, rotting
log, thick underbrush.

Easily visible exits:
South   West

OK, Now what? █
```

BLACKBEARD'S ISLAND

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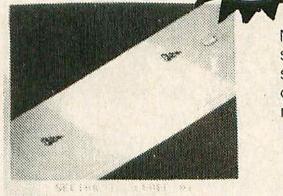

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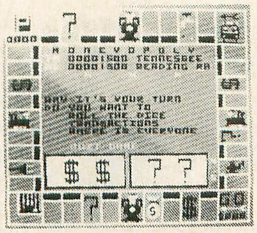

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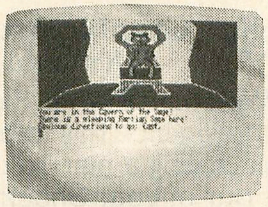

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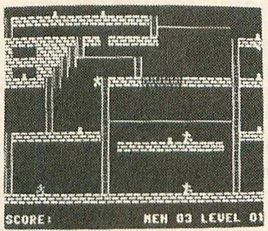

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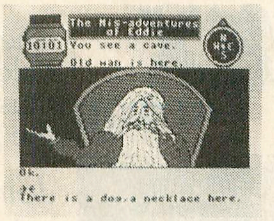

```
You see a cave.
Old man is here.

OK.

There is a dog, a necklace here.
```

THE MISADVENTURES OF EDDIE

Another great graphic adventure!! This time you are exploring an old mine shaft when you stumble upon an old man — and into a different time! His rebellious son Eddie is roaming around time creating havoc and you must bring him home in order to return to your own time. Visit the apple orchard of Isaac Newton, the doomed Titanic — over 140 different locations and 50-plus commands! All in hi-res graphics. Only for the very adventurous and those who "enjoy being frustrated"!

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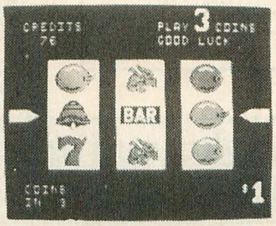

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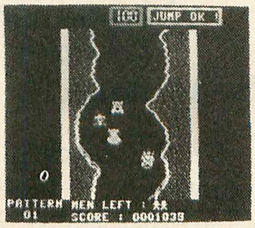

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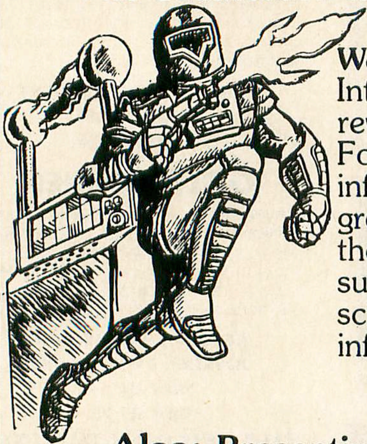
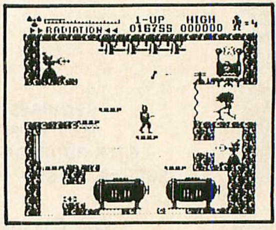
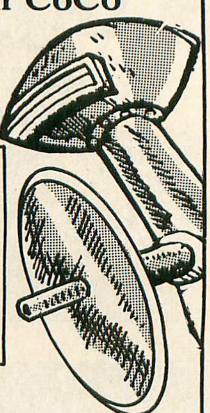


Welcome Shock Trooper Squad Commander! Intelligence has intercepted a coded message revealing a plan to conquer Earth. Four of your Shocktroopers must infiltrate the heavily defended underground enemy base and steal all of their secret TRG-5 attack saucer sub-assemblies. Return them to our scientists for analysis. This secret information is crucial to our defense.





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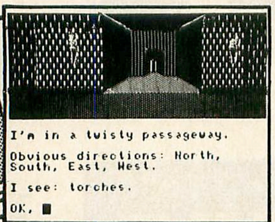
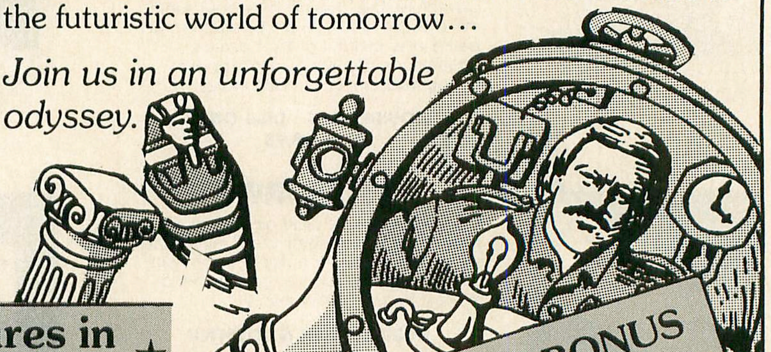


```
I'm in a twisty passageway.
Obvious directions: North,
South, East, West.
I see: torches.
OK, ■
```



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```
16BC 7E    1185    01429  JMP M5
                   01430
16BF 86    0A      01431 STORE LDA #$0A
16C1 8E    0009    01432  LDX #LPTBUF
                   01433
16C4 6F    86      01434 STORE1 CLR A,X
16C6 4A            01435  DECA
16C7 26    FB      01436  BNE STORE1
16C9 96    03      01437  LDA <OUT
16CB 81    48      01438  CMPA #'H
16CD 1027  FE13    01439  LBEQ CONVH
16D1 81    42      01440  CMPA #'B
16D3 1027  FE2F    01441  LBEQ CONVB
16D7 81    44      01442  CMPA #'D
16D9 1027  FE3A    01443  LBEQ CONVD
16DD 7E    14CE    01444  JMP CONVA
                   01445
                   01446 *
                   01447 *** MESSAGES AND PROMPTS
                   01448 *
                   01449
16E0       0D      01450 IOERR FCB $0D
16E1       49      01451  FCC "I/O ERROR IN "
16EE       44      01452  FCC "DRIVE NUMBER "
                   01453
16FB       302E    01454 DRVN FDB $302E
16FD       00      01455  FCB 0
                   01456
16FE       0D      01457 DNR FCB $0D
16FF       3D      01458  FCC "==> DRIVE NOT "
170D       52      01459  FCC "READY <=="
1716       00      01460  FCB 0
                   01461
1717       0D      01462 WRP FCB $0D
1718       3D      01463  FCC "==> DISK WRITE "
1727       50      01464  FCC "PROTECTED <=="
1734       00      01465  FCB 0
                   01466
1735       0D      01467 SYS FCB $0D
1736       3D      01468  FCC "==> SYSTEM "
1741       46      01469  FCC "FAILURE <=="
174C       00      01470  FCB 0
                   01471
174D       0D      01472 OPT FCB $0D
174E       41      01473  FCC "ABORT OR RETRY? "
175E       3C      01474  FCC "<A/R>: "
1765       00      01475  FCB 0
                   01476
1766       0D      01477 ERR0 FCB $0D
1767       49      01478  FCC "INVALID PARAMETERS"
1779       00      01479  FCB 0
                   01480
177A       0D      01481 ERR1 FCB $0D
177B       49      01482  FCC "ILLEGAL REQUEST"
178A       00      01483  FCB 0
                   01484
178B       0D      01485 ERR2 FCB $0D
178C       46      01486  FCC "FUNCTION UNDEFINED"
179E       00      01487  FCB 0
                   01488
179F       0D      01489 ERR3 FCB $0D
17A0       49      01490  FCC "ILLEGAL DRIVE "
17AE       4E      01491  FCC "NUMBER"
17B4       00      01492  FCB 0
                   01493
17B5       0D      01494 ERR4 FCB $0D
17B6       50      01495  FCC "PRINTER NOT READY"
17C7       00      01496  FCB 0
                   01497
```

```
17C8       0D      01498 ERR5 FCB $0D
17C9       49      01499  FCC "INVALID BAUD RATE"
17DA       00      01500  FCB 0
                   01501
17DB       0D      01502 ERR6 FCB $0D
17DC       49      01503  FCC "ILLEGAL RADIX"
17E9       00      01504  FCB 0
                   01505
17EA       0D      01506 NOLUCK FCB $0D
17EB       4E      01507  FCC "NO MATCH FOUND"
17F9       00      01508  FCB 0
                   01509
17FA       0D      01510 ABORT FCB $0D
17FB       46      01511  FCC "FUNCTION ABORTED"
180B       00      01512  FCB 0
                   01513
180C       0D      01514 FOUND FCB $0D
180D       4D      01515  FCC "MATCH FOUND"
1818       00      01516  FCB 0
                   01517
1819       20      01518 FORM FCC " TRK SCT OFS "
1826       48      01519  FCC "HEX DEC A 76543210"
1838       20      01520  FCC "  000 000 000 0FF "
184A       32      01521  FCC "255 ? 00000000"
1858       00      01522  FCB 0
                   01523
1859       0D0D    01524 FORM0 FDB $0D0D
185B       4A      01525  FCC "JADE PRODUCTS"
1868       0D      01526  FCB $0D
                   01527
1869       51      01528 FORM1 FCC "QUICKZAP 1.0"
1875       2020    01529  FDB $2020
1877       2020    01530  FDB $2020
1879       20      01531  FCC " IN=DEC  OUT=DEC"
1889       00      01532  FCB 0
188A       20      01533  FCC "          "
1893       54      01534  FCC "TRACK "
1899       30      01535 FMT FCC "000   "
189F       53      01536  FCC "SECTOR "
18A6       30      01537 FMS FCC "000   "
18AC       0D0D    01538  FDB $0D0D
                   01539
18AE       0000    01540 END FDB $0000
18B0       0000    01541  FDB $0000
18B2       0000    01542  FDB $0000
                   01543
18B4       41      01544 RADS FCC "ASCBINDECHEX"
                   01545
18C0       00      01546 LFEED FCB 0
                   01547
                   01548 *** CODE ENDS HERE
                   01549
                   01550 *
                   01551 *** BOOT TRAILER
                   01552 *
                   01553
010C               01554        ORG VECJMP
                   01555
010C 7E    0E6D    01556  JMP >IRQ
                   01557
                   01558 *
                   01559 *** BASIC EXEC ADDRESS
                   01560 *
                   01561
           0E00    01562        END ENTRY
00000 TOTAL ERRORS
```

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CoBBS:
A Look At The Commands

By Richard Duncan

In Part 2 of this series, we'll discuss the logon routine and provide the listings for logon, start-up and creating the RS-232 driver.

Welcome back! Last month we introduced you to *CoBBS*, a bulletin board program designed to give you, the SysOp, the power you need. This month we will look at the commands available, discuss the logon routine and provide the listings for logon, start-up and creating the RS-232 driver.

Table 1 is a list of the various commands available to the SysOp. When *CoBBS* boots up into the main system it goes out to disk and gets information from a file named *MENU/SYS*. This file contains the data required to set up a menu for the user. A menu can be any number up to 255. A discussion of the menu file will be done later with how to actually set up the menu.

What we need to remember now is that each menu consists of different commands, which are called command types. A command type is an ASCII character. For instance, the command used to download is a Type 'D'. Certain types of commands require additional information and that is contained in the DATA. We will discuss the additional data required when needed.

Load Commands

Types !, #, $, (and) are considered Load commands. These are used to allow access to the various editors (load and run them) from a BBS menu without the need to exit into BASIC. None of the editors have to be on the disk for the system to operate normally — whether they are or not depends on your convenience and disk space. No optional data is required for any of these types.

List Commands

Types 0, 1, 2 and 3 are LIST commands. These are used to list various text files on the disk. Type 0 is for HELP files. Additional information is required and the format is BNAME. Optional data can contain up to five characters, which this one does. The 'B' part of it is for "buffer control." If B=0 then the file will just list; if B=1 then the system will send an open buffer control code to the user, list the file and close the buffer. The "NAME" part is a four-character name to specify which file to list.

The BBS creates the name of the file to list from the LIST type and the four-character name. If you specified the optional data to be "1CLUB," then the system takes the name CLUB and adds HELP in front of it since this is a HELP list. It also adds the suffix "/TXT." Since a '1' was specified, the system opens the user's buffer, lists the file *HELPCLUB/TXT* and closes the buffer. You do not need to specify the drive number as the BBS searches all of your drives for the file.

The only difference between the HELP type and the others is the first four letters of the filename. A Type 3 command that has the same information as above in its DATA will search for a file called *BULLCLUB/TXT*.

Leave Commands

There are three leave commands: types L, N and Y. A Type L command

---

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is the standard leave. It allows a user to leave a message to another user on the system. The menu number to post the message to is put in the optional data. If a 'P' is included in the data then the user may specify that the message be private, otherwise only public messages are allowed. Putting a 'K' in the data will tell the system to kill the message after it has been received.

Type N is the same as 'L' except this type only allows private messages. It is considered the "Email" type. Type Y is the SysOp message leave. It is posted to menu 255 and is always addressed to the SysOp. No one except those with SysOp privileges will be able to see this message.

You can specify that the message be posted to any menu other than 255. If you specify a menu between 0 and 249, then the message is posted to that number and a Read command is required, which allows viewing of that number. Specifying a number between 250 and 254 causes the system to ask which number the user wants to post that message to. He can specify any menu number that he is authorized on, including 250 through 254. If you specify 255 as the number, then another number must be given by the user and can be any active menu on which he is authorized.

Read Commands

Read commands allow the user access to messages posted to the system. There are four commands types: R, V, W and X. Type R is the standard read. It allows the user to read any message posted to the number specified in its data if that message is a public message. A private message may be read if it is *to* or *from* that user. A Type V is the same except it allows the user to read all messages (public and private) posted to the number specified in DATA, even if not addressed to him.

Types W and X take the privilege one step farther. A Type W allows the user to read all public messages and private messages (if to or from him) posted to *any* number on or below the number specified in DATA. This is a kind of combined message read. The Type X is the same except it allows the reading of all messages, like Type V, posted to the number specified in DATA or below.

Messages may be read in a forward or reverse scan, or individually. There is also a NEW mode in which the system shows the user all the messages that have been posted since the last time he was on. While the message is being read, pressing a 'P' pauses the message scroll and pressing ENTER resumes it. Also, an 'N' stops that message and goes to the next one, while an 'S' stops the Read function and returns to the menu.

If a message is deleted the user is given the opportunity to reply. Make special note of one thing: The system determines who is authorized to reply to a message by the privilege of the *first* Leave command on the menu he is using. If a privilege of 30 is required to leave a message and the user has a privilege of 25, he may not reply to that message even if it is addressed to him. A menu may contain several different types of Leave commands, but the first one of the list is the one that determines the required privilege to reply to a message.

There are four additional Read commands. Types S, 7, 8 and 9 are SCAN types. These operate the same as their Read counterparts, except only the header of the message is printed and the user is then given the option of reading the text or continuing.

Download Commands

This is the standard download of the board, and all files must be in ASCII. A good understanding is required of the way the system determines the filenames.

The download type has a privilege level and 16 flags as do all commands of *CoBBS*. The DATA is formatted as follows: BNAME, where 'B' is the buffer code and "NAME" is the download's four-letter name.

The best way to understand how the downloads function is to take an example. Consider the following command specification.

Type: D
DATA: 0COCO

DATA is "0COCO." The buffer number is zero; this means when the directory of programs available is listed the user's buffer will not be opened and closed automatically. A '1' as a buffer number would specify "open buffer, list directory, close buffer."

The download's name is "COCO." The system takes the name COCO and adds the following: DOWN + name + /MNU so the name of the text that contains the directory of programs available is *DOWNCOCO/MNU*. The directory should contain a program number or designation for each item listed. An example of a download directory is:

1) *INVENT/BAS* — Program to maintain your inventory.
2) *DIRPRINT/BAS* — Print out your disk directory.
3) *STREK/BAS* — Excitement of Captain Kirk.

The user is then prompted for the number to download. This is why you want to set up a directory preferably with numbers. The download command takes this number to specify the file to be downloaded. The format for this is NAME + number + /DOW. For our example, if the user chooses number '1', then the file the system looks for is *COCO1/DOW.*

There is a totally different type of download available and it is set up by using a '3' or '4' in the buffer code of the DATA statement. While a '0' or '1' determines whether or not the user's buffer is opened when the menu is listed, it takes on a different meaning when the code number is greater than two. The format for the DATA statement in these cases is: BDPxx, where 'B' = download type; 'D' = drive to access for downloads; 'P' — if a 'P' is included then the user may not download any program with an extension of "/SYS," "/BAK" or "/BIN."

When a '3' or '4' is specified in DATA the user is prompted with "FILE TO DOWNLOAD:" only. He supplies the filename desired. If a '3' is used the system limits the user's access to only the drive specified in DATA. If a 'P' is included the user may not download any program with extensions noted in the format above. A "B=4" allows full access to all drives. Information that is specified in DATA is ignored. A 'P' restriction may also be used in this type.

One other command is available when using a '3' or '4'. When prompted for the file to download, a directory may be obtained and listed by using the DIR command for the drive desired.

Upload Commands

All uploads are the same for any menu, but there are options available to the SysOp determined by DATA. The format of DATA is: TDxxx, where, T = type of upload; D = drive to upload to; xxx = ignored by system.

When T=1 the system uploads to the specified drive in DATA. The user provides an eight-character filename and the system adds a "/UPL" extension. If a file exists already it may not be overwritten. If T=2 the user specifies the

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filename and extension. Upload goes to the drive specified in DATA. No overwrites are permitted. A T=3 allows the user to specify filename, extension and drive for the file to write to, but will not allow a file to be overwritten. A T=4 lets the user specify the filename, extension and drive for the file to write to. If the file exists, it will be overwritten.

Menu Control File

Type @ is a menu control command for the user. This command gives the user some control in how the menus list and which menu he will access the system when logging on. The first part is the Menu Control Editor. This allows the user to specify which menu he will initially use after getting through the logon routine. It is normally set to menu zero through *SCF/EDI* for new users, but may be changed by the user to any menu that he is authorized. If changed, the next time the user calls he automatically starts on that menu after logging in.

The second part of this command allows the user to determine how the various menus will prompt him from full menu listing to just seeing "COMMAND" only. Even if a user chooses a higher menu prompting, if he gets lost or cannot remember what the various commands are, he may hit the carriage return key to get a full listing of the menu.

System Movement

The following commands are used to move between menus and also out of the system.

Type A is considered an ABORT command. This will exit a menu and go to another one based on DATA. The following types are available:

0 — Return to menu the user last came from
1 — Return to menu specified as the logon menu
2 — Return to menu zero

Type E to exit and run the BASIC program specified in DATA. (Note: If no extension is given on a filename it is assumed to be "/BAS."

Type G is a GOTO command. The system will "goto" the menu number specified in DATA.

Type Q is the same as END. It stops the board program and puts the user into BASIC.

DATA: 0 — Exit immediately
1 — Exit with password

The format of DATA is TPASS, where T=type of quit; PASS=four-character password if Type 1.

Type T terminates the user's session. DATA specifies whether the user is asked if he wants to leave a SysOp message or not. DATA types are:

0 — Terminate immediately
1 — Allow the user to leave a private message to the SysOp

Type Z causes the system to restart as if the user has first called.

Miscellaneous Commands

Type * command shows the user start time, end time and time on system.

Type C is a "chat" command. It pages the system with audio tones, then prompts the user to continue using the system until the SysOp breaks in. Entry into chat is by pressing the space bar. To exit chat mode, press SHIFT and CLEAR, then ENTER on a line by itself.

Type O lists the user in the Userlog file (*USERL/SYS*). It either searches for a certain user or lists the whole file. New users will not be displayed. This way, a nuisance caller cannot access the system and see his "name" up in lights. It displays Probationary users and Registered users.

Type P is a password change command. It allows the user to change the password that he uses to access the system.

Logon Routine

After going through a BOOT process the system comes up with a screen that has the BBS's name, copyright, message numbers, etc. The system waits until it either receives a carrier or gets one of the SysOp's key commands.

Upon receiving a carrier, the system prints the board's name and copyright. (I feel like it is very little to ask that this be retained. Since this is one of the few requirements I had when releasing it for distribution, I hope that you would be decent enough to give me credit for my time and work.)

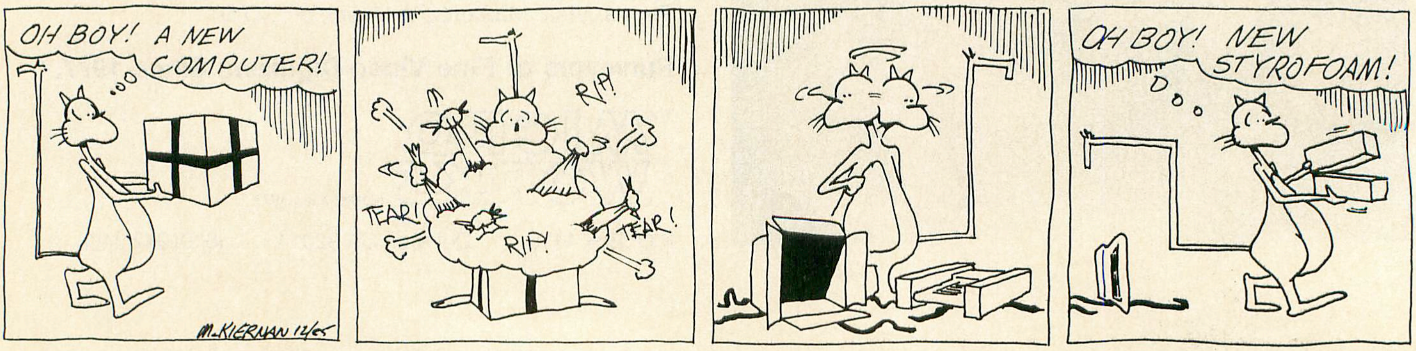
After the copyright is displayed, the system checks to see if it has received a Control-C or an '*'. If so, before it lists a *SIGNON/TXT*, it prints the prompt PLEASE PRESS <ENTER> TO CONTINUE:. At this point, you may enter a password and exit directly into BASIC. This password is specified in Line 22 of *USER/SYS* and should be changed to whatever you want. Since it is a string the password may be up to 250 characters long. If no Control-C is received, the system goes on and lists *SIGNON/TXT*.

The system then asks for a user number. This feature allows a user to have quicker access. The user number is actually the record number of his entry and is given to the Registered users after he logs on and sees the system information. Note: The use of this type access requires that users must not be deleted from the userlog or all numbers past that point will be changed. If this type of access is not desired, then remove Line 68 from *USER/SYS*.

Users who do not have a number, or if it is not used, are requested to enter their name and where they are from. They may use a semi-colon to separate "name;from" to enter it all on one line. If there is no space in the name they are requested to enter it again, thus, hopefully requiring them to enter first and last name. If the information they entered is more than 90 characters long, then they are dropped. This is helpful

---

CoCo Cat


OH BOY! A NEW COMPUTER!
RIP!
TEAR!
RIP!
TEAR!
OH BOY! NEW STYROFOAM!
M. KIERNAN 12/85

for the nuisance calls. The system then checks the *USERL/SYS* file for any record of them. If found, it will request their password and give access if entered correctly.

There are four different ways you can specify that a caller be handled when logging in:

1) If not already in the Userlog, the system disconnects.
2) User is requested registration information and then terminated.
3) Same as '2' but the system displays an ASCII text file, *NEWUSER/TXT*, and disconnects.
4) Normal operation. New user will register and access.

Of course, a caller who is in the Userlog will access the system normally.

After all the above has been completed, the user will be into the system. If specified by *SCF/EDI* (System Control File, to be discussed later) the system checks for any messages to the user. This routine may be aborted by the end user by pressing the 'S' key during the check. If a message is waiting, the user is shown its number, menu name, who it is from and the subject.

Access is now complete and the main BBS routine is loaded and run.

Starting Up

Some of the routines required to boot up the system will be presented in Part 3 of this series, which includes the System Control File Editor (*SCF/EDI*) and the editors to create the file *MENU/SYS*. Let's look though what is involved in booting up the BBS.

1) Format a disk for each drive to be used on the system. The one referred to as the "system disk" is the one in Drive 0.

2) Load and run the System Control File editor and create the system parameters you desire to match your equipment online.

3) There are three programs that are only used once when booting up the system. If you do not wish to keep them online and save disk space, format another disk for these files and copy them over. These are *64/BAS, STARTUP/BAS* and *COTERM/SYS*.

4) Copy the following files over to the system disk that will be in Drive 0: *USER/SYS* and *COBBS/SYS*.

5) Copy the following files to the disk that will keep that file as specified by *SCF*: *MENU/SYS, USERL/SYS, HDR/SYS* and *MSG/SYS*. For example, if you specified the message header to be on Drive 1, then copy *HDR/SYS* to the disk that will be in Drive 1.

6) If you are going to call up an editor from the board then copy over the ones desired to Drive 0.

7) Get the system into 64K. Type `PCLEAR1` and press ENTER. *CoBBS* must be run in 64K mode.

8) Load and run *STARTUP/BAS*. Enter the correct date, day (first three letters) and time. You are prompted as to whether or not you want to "PROTECT?" the system. If you answer "yes," the system's BASIC is modified. When under protection, if the board ever breaks into BASIC it locks up. The routine is crude but effective and secure.

You are asked if you want the "C/R Mod?" This modifies the RS-232 driver so the system puts out a `CHR$(13)` when no carrier is being detected.

This mod requires a few additional steps for the SysOp to use the system locally. Before exiting the system, or using the SysOp logon, it is necessary to remove the modification. This is done within the system by using its exiting commands. To logon locally, you must first exit into BASIC with the SHIFT and up-arrow key, then type `RUN`. When the screen reappears, press the '@' key as you normally would. To reinstall the modification in either *USER/SYS* or *COBBS/SYS*, type `GOTO10000` from BASIC. Typing this in *USER/SYS* completely reboots and reprotects the system, including dropping the modem. Doing it while *COBBS/SYS* is loaded reprotects and starts *COBBS/SYS* again, but doesn't drop the modem.

If the boot programs are put on a separate disk, insert the system disk in Drive 0 before answering the protect question. After answering, the system loads the logon routine and presents you with the standby screen.

With the system protected, the SysOp may not break into BASIC with the BREAK key, but presses and holds the SHIFT key. Next, press the up-arrow key while still holding down the SHIFT key. Once you break into BASIC this way the system is no longer protected. To reprotect, type `GOTO10000` while the logon routine is in memory.

Conclusion

We will continue next month and look at all the editors required to get the system up and maintain the Userlog. I will be glad to provide you with a disk of all the programs and also a disk with expanded documentation for $25. If you have any questions you can call my BBS at (501) 735-5614 online 24 hours a day, or write to me at 2504 N. Gathings Drive, West Memphis, AR 72301. ☐

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SUPER PAINT

by John Crane

Super Paint is an exciting new enhancement for your Graphicom drawing system. Break the chains restricting your creative freedom! Now you can draw and paint with every color your machine is capable of. Over 250 colors are available at all times! It's no longer impossible to find just the right shade or texture. Super Paint brings the COLOR back into your Color computer! Requires Graphicom system.

32K Disk $19.95

MichTron

576 South Telegraph
Pontiac, Michigan 48053
(313) 334-6576

Table 1
Command Types

Type	Name	Data
!	LOAD "SMF/EDI",R	
"	Reserved	
#	LOAD "SUL/EDI",R	
$	LOAD "SCF/EDI",R	
%	Reserved	
&	Reserved	
'	Print messages	0 or 1
(	LOAD "LOOKTRAC/BAS",R	
)	LOAD "LOOKREG/BAS",R	
*	Time on system	
+	SysOp option	
,	SysOp option	
-	SysOp option	
.	SysOp option	
/	SysOp option	
0	List HELP file	BNAME
1	List INFO file	BNAME
2	List TEXT file	BNAME
3	List BULL file	BNAME
4	Reserved	
5	Reserved	
6	Reserved	
7	Scan, 1 menu, all messages	Menu #
8	Scan, menu down, private TO/FROM	Menu #
9	Scan, menu down, all messages	Menu #
:	Reserved	
;	Reserved	
<	Reserved	
=	Reserved	
>	Reserved	
?	Reserved	
@	Menu control editor	
A	Abort out of menu	0,1,2
B	Reserved	
C	Chat. Page system	
D	Download a file	BNAME
E	Exit and run program	program name
F	Load and run file specified	
G	Goto menu #	Menu #
H	Reserved	
I	Reserved	
J	Reserved	
K	Kill messages	
L	Leave messages (standard)	Menu #, (P)
M	Read E-mail (private)	Menu #
N	Leave E-mail (private)	Menu #
O	List Userlog	
P	Password enter/change	
Q	Quit. Exit to BASIC	0,1
R	Read messages (standard)	Menu #
S	Scan messages (standard)	Menu #
T	Terminate	0,1
U	Upload an ASCII file	0,1,2,3,4
V	Read, 1 menu, all messages	Menu #
W	Read, menu down, TO/FROM	Menu #
X	Read, menu down, all	Menu #
Y	Leave SysOp message	
Z	Restart logon	

220 220
570 28
750 203
END 227

Listing 1: STARTUP

```
5 CLEAR1000
10 POKE65386,106:CLS
20 PRINT"-COBBS BBS STARTUP-"
30 PRINT"-         BY       -"
40 PRINT"-RICHARD  DUNCAN   -"
50 PRINT"-     <C> 1985     -"
60 PRINT:PRINT
70 LOADM"COTERM"
80 DEFUSR0=&H0ED0
90 DEFUSR1=&H0ED3
100 POKE65387,54
110 POKE65386,106
120 PRINT"PNPCLK/BAS - <C> A. B.
 TREVOR"
130 INPUT"DATE (MM,DD,YY)";MM,DD
,YY
140 POKE4608,MM:POKE4609,DD:POKE
4610,YY
150 LINEINPUT"DAY: ";A$
160 K=(INSTR(1,"SUMOTUWETHFRSA",
LEFT$(A$,2))-1)/2:X=USR0(K)
170 INPUT"TIME (HH:MM)";HR,MN
180 X=USR1(HR*256+MN)
190 X=VAL(HEX$(PEEK(&H0EFD))):PO
KE4611,X
200 EXEC&H1091:PRINT"AT S0=1 E0
S2=255":POKE&H110A,&H12:POKE&H11
0B,&H12:POKE&H113C,&H12:POKE&H11
3D,&H12:PRINT:PRINT
210 FOR A=&H10D5 TO &H10D7:POKE
A,&H12:NEXTA:GOTO250
220 PRINT"LOADING LOG-ON ROUTINE
"
230 GOSUB6000:GOTO590
240 PCLEAR1:GOTO70
250 PRINT:PRINT"ERROR TRAP - BY
ANDY KLUCK
260 CLEAR200:GOSUB500
270 AD=&H0E10
280 EX=AD
290 FOR AD=AD TO AD+&H7B
300 READD$
310 POKEAD,VAL("&H"+D$)
320 NEXT
330 EXEC EX
340 GOTO220
500 DEFFNPL(X)=PEEK(X)*&H100+PEE
K(X+1):RETURN
510 DATA CC,7E,39,E7,8C,FA,30,8D
,0,15,F6,1,94,FE,1,95
520 DATA E7,8D,0,1E,EF,8D,0,1B,B
```

```
7,1,94,BF,1,95,39,1F
530 DATA A9,35,40,81,54,27,10,34
,40,34,4,C6,39,F7,1,8E
540 DATA 35,1,7E,FF,FF,FF,FF,9D,
9F,BD,AF,67,C6,39,F7,1
550 DATA 8E,DC,2B,27,15,BD,AD,1,
25,11,AF,8D,FF,E7,30,8D
560 DATA 0,C,BF,1,8F,C6,7E,F7,1,
8E,39,7E,AE,D2,86,39
570 DATA B7,1,8E,9E,68,30,1,27,F
1,D7,FD,DC,68,DD,FE,BD
580 DATA AD,33,AE,8D,FF,BF,BD,AE
,BB,7E,AD,9E
590 PRINT"INSERT SYSTEM DISK."
600 LINEINPUT"PROTECT? ";A$:IFLE
FT$(A$,1)="Y" AND PEEK(4684)<>18
8 THENGOSUB640
610 GOTO710
620 LINEINPUT"C/R MOD? ";A$:IFLE
FT$(A$,1)="Y"THEN10000
625 LOAD"USER/SYS",R
630 END
640 L=&H0E00
650 POKE&HAC7D,&H0E:POKE&HAC7E,&
H00
660 POKEL,&H86:POKEL+1,0
670 POKEL+2,&HB7:POKEL+3,&HFF:PO
KEL+4,&H40
680 POKEL+5,&HB7:POKEL+6,&HFF:PO
KEL+7,&H6A
690 POKEL+8,&H7E:POKEL+9,&HA3:PO
KEL+10,&H90
700 RETURN
710 '-SYSTEM CONTROL FILE-
715 CLEAR1000
720 DSKI$ 0,17,18,S1$,S2$
730 POKE4629,ASC(MID$(S1$,9,1))
740 POKE4664,ASC(MID$(S1$,10,1))
750 POKE4663,ASC(MID$(S1$,11,1))
760 FOR A=0 TO 2:POKE4660+A,ASC(
MID$(S1$,12+A,1)):NEXT A
770 POKE4628,ASC(MID$(S1$,15,1))
780 POKE4666,ASC(MID$(S1$,16,1))
790 POKE4669,ASC(MID$(S1$,17,1))
800 POKE4679,ASC(MID$(S1$,18,1))
810 POKE4680,ASC(MID$(S1$,19,1))
820 POKE4667,ASC(MID$(S1$,20,1))
830 POKE4659,ASC(MID$(S1$,21,1))
840 POKE4694,ASC(MID$(S1$,22,1))
850 FORA=0TO6:POKE4670+A,ASC(MID
$(S1$,23+A,1)):NEXT A
860 GOTO620
6000 PRINT:PRINT"DISK DOS TYPE"
6005 PRINT"  A - DOS 1.0":PRINT"
  B - DOS 1.1"
6010 LINEINPUT" >";A$
6015 IFA$="A"THEN6030
6020 IFA$="B"THEN6050
6025 GOTO6000
6030 POKE4681,&HCB:POKE4682,&H4A
6035 POKE4683,197:POKE4684,143
6040 RETURN
6050 POKE4681,&HCC:POKE4682,&H1C
6055 POKE4683,197:POKE4684,188
6060 RETURN
10000 REM
10005 X=&H112B:POKE X,&H86:POKE
X+1,&H0D:POKE X+2,&HB7:POKE X+3,
&H11:POKE X+4,&H81:POKE &H1127,&
H10
10010 GOTO625
```

37	218	740	178
70	174	940	239
110	188	4125	201
175	21	7055	8
211	75	8075	189
240	149	8120	162
268	234	9115	174
300	22	9440	227
371	229	9710	184
455	24	END	59
535	11		

Listing 2: USER SYS

```
0 '-COBBS (USER/SYS) <C>1985
     RICHARD DUNCAN (7/8/85)
5 '-LOGIN ROUTINE-
10 CLEAR500:RUNT900:GOSUB8100
15 POKE65386,107:CLOSE:UNLOAD
20 CLEAR4000:DIM BN$(255):NU$=CH
R$(0):RUNT900:DEFUSR0=&H0ED3:CJ$
=CHR$(13)+CHR$(8):DR$(0)="0":DR$
(1)="1":DR$(2)="2":DR$(3)="3":PO
KE4658,255
22 PW$="EXIT PASSWORD"
24 POKE&H016B,&H10:POKE&H016C,&H
CD:GOSUB8200
25 CLS:PRINT:PRINT:Z=PEEK(65385)
:Z=Z AND 32:IF Z=0 THEN 40
26 GOSUB8000:TIMER=0
30 II$=INKEY$
31 IF II$="@"THENCLS:POKE4658,0:
GOTO66ELSEIFII$="_"THEN FOR X=&H
112B TO &H1136:POKE X,&H12:NEXT
X:IFPEEK(4684)<>188THENPOKE&HAC7
D,&HA3:POKE&HAC7E,&H90:ENDELSEEN
D
34 II=TIMER:IFII>19999ANDPEEK(46
94)<>0THEN CLS0:IFII>60000THEN T
IMER=20000
35 IF II$="*"THENGOSUB800:GOTO26
```

SIMULATIONS

P51 Mustang Attack Flight Simulator
JUST IMAGINE! Your movements are shown at any remote CoCo across town or across the country. It's hard to believe it's simulation.
P40 shown.

P51 Mustang

Attack Flight Simulator

Experience the ultimate video experience. For the first time ever, two computers can be linked together with action and re-action at at either location, or play alone. The P-51 Mustang was the attack workhorse during WWII. To experience the flight of this beautiful plane in actual combat situation will give many hours of excitement. You can test your skill against the computer to defend your position or try *your hand* competing against your opponent at any remote location. Two CoCo's can be linked by cable for **TRUE** two-player adventure. With the use of a modem you can test your skill across town or across country!! (Each individual needs a copy of the program.) This program is another first from Tom Mix Software. Order your excitement today. Direct cable available separately for using two computers at the same location.

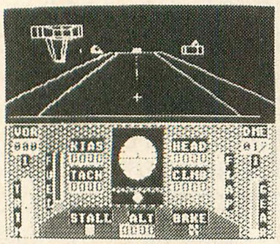
32K Machine Language Tape $29.95 Disk $34.95 Cable $10.95

Worlds of FLIGHT

Jump in the pilot seat - not a game - A realistic Flight Simulation

"World's of Flight is the best out-the-window simulation available for the CoCo". Dr. Scott L. Norman, Hot CoCo, Dec. 1984.

Worlds of Flight (WOF) is a machine language, real-time flight simulation (of a sophisicated ultra-light aircraft). The program is available on DISK but was specifically designed to bring unprecedented detail and power to CASSETTE systems. WOF generates panoramic 3-D views of ground features as the pilot flies within one of nine different "worlds". Instrument flight capability has been provided along with some aerobatic performance. The simulation models over 35 different aircraft and flight performance parameters including winds and cloud ceilings. Sound effects have been faithfully reproduced to provide an even greater sense of realism. A 25 page light manual explains the instrument panel, the basis of flight control, instrument navigation and even walks the pilot through a take off / landing sequence about the airport. Complete with charts bound in an attractive binder, the entire WOF package challenges you to find a more advanced flight simulation for **any computer**. . You simply can't! If you are a serious simulation buff this one is for you!

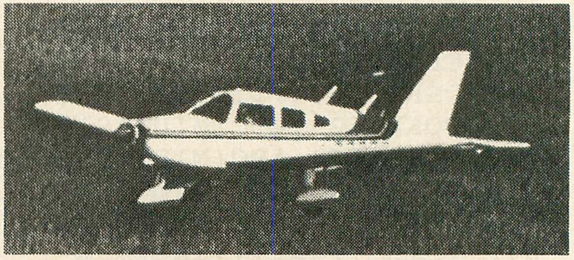


JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $29.95

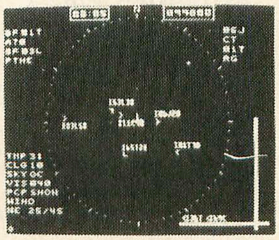
DISK $34.95



NEW!

APPROACH CONTROL SIMULATION

From Betasoft Systems



"Caught in a blinding snowstorm, two jet airliners are on a collision course The pilots are completely unaware of the imminent danger. Hundreds of lives are at stake. A high-speed disaster is inevitable unless you act fast. . ."

This and many other exciting scenarios await you as "Air Traffic Controller" with the APPROACH CONTROL SIMULATION. The thrills, challenges and frustrations you'll experience with this authentic, real-time simulation will lead to countless hours of discovery and adventure.

★ ★ A Complete Simulation Package ★ ★

- **Software on Disk or Tape**
- **Comprehensive Manual**
- **Quick Reference Guide**
- **No Joysticks Required**

32K MACHINE LANGUAGE TAPE $29.95 DISK $34.95

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GAMES

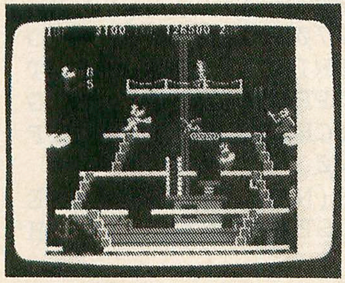
Requires 64K Machine Language

THE SAILOR MAN

TAPE $29.95
DISK $34.95

The first screen objective is to catch enough of Elsie's kisses (those Red Heart Shaped Things) to fill in the squares on the Sailorman's house. If you can time your punch just so, you can send the punching bag over to knock the bucket down and, with a little bit of luck, right on **Bigfatbadguy's** head. This will give you a little (but not much) time to catch all those RHSTs.

You must avoid contact with **Bigfatbadguy** who is actively pursuing you. You must also be careful of **Olduglyseawoman** who will appear at higher difficulty levels to chuck empties at you. Either avoid the flying bottles or punch them (with the fire button) to keep from being knocked into the water.

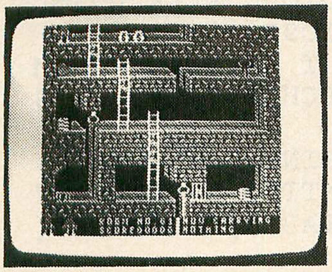


The second screen objective is to collect enough notes to play Elsie a little love song. You may jump off and onto the other end of **Fatguyeatinghamburger's** teetertotter to fly up a deck and even two decks if you manage to catch hold of **Smartaleckkid's** grab handles. Time it right and away you go.

The Third screen objective is to collect enough letters (thrown by Elsie's cries for H-E-L-P) to complete a ladder all the way to the crow's nest where Elsie is calling you. Beware of the Crow, however, who thinks you are after her eggs!

On all screens, eating a can of collard greens (labeled "S" for Collard and grasped by punching the can just right) will give you amazing speed, strength and ability and allow you to send **Bigfatbadguy** into the drink with a single punch.

DRAGON SLAYER



Save the villagers of Pendor! They live in fear of Icarus, the blood thirsty dragon. The dragon lives in a cave, way up in the mountains. The cave is a treasure chest, full of gems and cashbags. The trail to the cave is as menacing as Icarus himself. Outstanding graphics throughout. 160 screens of exciting action packed arcade excitement.

32K Disk $29.95

THE KING	**32K**	**FROG**	**16K**
Tape $26.95	**Disk $29.95**	**Tape $27.95**	**Disk $30.95**
SR-71	**32K**	**FANGMAN**	**16K**
Tape 28.95	**Disk $31.95**	**Tape $24.95**	**Disk $27.95**
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Tape $27.95	**Disk $30.95**	**Tape $24.95**	**Disk $27.95**
MS. MAZE	**32K**	**WAREHOUSE MUTANTS**	**16K**
Tape $24.95	**Disk $27.95**	**Tape $24.95**	**$Disk $27.95**

UTILITIES

NOW! You can own the tools we've used to create "Donkey King", "Sailor Man", and others.

We are proud to announce our new utilities for the 64K Disk Color Computer, featuring.......

- **Full** use of 64K RAM
- 100% Machine Language
- Parameters easily changeable in basic loader
- No ROM calls
- "Cold start" exit to basic
- Easy-to-read, informative documentation
- Keyklik
- Selectable drive stepping rate
- Support 1-4 drives
- Easy to use, with menu selected functions

To make life with your disks easier, may we suggest...

MAS — the finest assembler ever written for the Color Computer (includes EDT)......... **$74.95 Disk**

EDT — effortless full (51×24) screen editing w/2 way cursor. Disk commands allow easy save/backup/append. Text files to 48K+. Copy, save, move, delete or print blocks. Much more......... **$39.95 Disk**

The Deputy Inspector — Alphabetize, re-sort, and backup directory; **fast** 3-swap backups, copy files or programs to same or other disks, can auto-reallocate granules during backup for **faster loading,** and more... **$21.95 Disk**

The Sector Inspector — Alphabetize, backup, and printout directory; repair crashes, LLIST basic programs, name disks, read in and edit 23+ grans, 3-swap backups, and more. Has 16-page manual and gran table print program......... **$29.95 Disk**

EDUCATIONAL

FACTPACK

FACTPACK is a set of 3 programs designed for home or school use. The programs provide drill and practice with basic addition, subtraction, multiplication and division facts and are appropriate in grades 1-6. Each program requires a 32K Extended BASIC Color Computer. Disk drive and printer are optional.

Requires 32 K Ext. Basic Tape $24.95 Disk $29.95

TEACHER'S DATABASE II

DISK ONLY
64K Req.

Teachers' Database (TDB) is a program designed to allow a teacher to keep a computerized file of information about his/her students.

The program requires a 64K Color Computer and at least one disk drive. This completely revised program includes all of the capabilities of the original TDB plus many new features.

- Information on as many as 100 students, or more, may be in the computer at one time.
- Each student may have as many as 20, or more, individual items of data in his/her record.
- The program has many easy to follow menus.
- Records may be easily changed, deleted, or combined.
- Information about students may be numerical or text.
- Records may be quickly alphabetized or reordered based on their contents.
- Records may be sored by various criteria.
- A full statistical analysis of scores may be done and sent to the printer.
- Student test scores may be weighted, averaged, changed to a percentage or changed to a letter grade.
- Individual student progress reports and class gradebook sheets may be printed.
- Three methods of data entry spped the task of typing in student grades and test results.
- The program may be easily customized to work with any printer.
- Student seating charts may be created and printed.
- Graphs of student test results may be created using the computer's high resolution graphic screen.
- Grade distribution can be displayed numerically or as a histogram.

64K TDBII $59.95 • 32K TDB Version - DISK $42.95 TAPE $39.95

VOCABULARY MANAGEMENT

Requires 16K Ext. Basic or 32K for printer output.

The Vocabulary Management System (VMS) is a series of programs designed to aid a parent or teacher in helping children to learn and practice using vocabulary and spelling words. The 11 programs that comprise the VMS include a full feature data entry/edit program, three printer output programs and 5 vocabulary/spelling game programs. The system's many outstanding features include:

- As many as 300 vocabulary words and definitions may be in the computer's memory at one time.
- Words and definitions may be saved on disk or tape.
- Remarks and/or comments can be saved with word files.
- A disk loading menu allows students to load disk files without typing file names.
- Word lists may be quickly alphabetized.
- The three printer segments allow you to create and print individualized tests, puzzles, word-searches and worksheets.
- The printer segments allow full use of your printer's special features.
- The 5 game programs are based on sound educational principles and provide practice in identifying words and matching them with their definitions in a fast-paced set of activities.

TAPE $39.95 DISK $42.95

FRACTIONS - A Three Program Package

MIXED & IMPROPER

1. Review converting mixed numerals and improper fractions.
2. Practice converting mixed numerals to improper fractions.
3. Practice converting improper fractions to mixed numerals.
4. Practice of both types. (Mixed to improper & improper to mixed)
5. Review converting mixed numerals to mixed numerals. (Used in regrouping in substraction).
6. Practice converting mixed numerals to mixed numerals.

EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of dinding if one fraction is equal to, not equal to, less than or greater than another.

LOWEST TERMS

1. Review of placing fractions into lowest terms by dinding the greatest comon factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

32K EXT BASIC TAPE $30.95 DISK $35.95

MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer in a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you tog ather more numbers and thus more points than the computer.

The game is deceptively simple. you select the size of the playing field that is composed of from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

32K EXT. BASIC TAPE$24.95 DISK $29.95

```
36 IF II$<>""THEN40
37 CD=PEEK(65385)AND32:IF CD=0TH
EN FOR A=1TO200:NEXT A:GOTO40
38 GOSUB9400
39 GOTO30
40 CLS:EXEC&H10DA:POKE4657,0
45 REM A=JOYSTK(0):SP=JOYSTK(2):
IF SP<5 THENPOKE65387,56ELSEPOKE
65387,54
50 FOR A=1 TO 10:PRINT:NEXT
60 CLS:PRINT"COLOR BBS SYSTEM":P
RINT"CoBBS VERSION 1.2":PRINT"<C
>1984 by Richard Duncan":GOSUB97
00:PRINT:PRINT"CoBBS #xx":PRINT:
PRINT:PRINT:GOSUB1200
61 RUNT65:D=0:POKE&H016B,197:POK
E&H016C,PEEK(4684)
62 F$="SIGNON/TXT:"+DR$(D)
63 OPEN"I",#1,F$
64 RUNT66:IFNOTEOF(1)THENGOSUB97
00:LINEINPUT#1,A$:PRINTA$:GOTO64
ELSECLOSE:D=5
65 D=D+1:IFD<4THEN62
66 RUN T 900:GOSUB9000:IFK1=0THE
N67ELSEGET#1,1:RE=CVN(H1$):GET#1
,2:RS=CVN(H1$):CLOSE
67 CLOSE:GOSUB9400:POKE4612,HR:P
OKE4613,MN:POKE4614,S:DT$=CHR$(P
EEK(4608))+CHR$(PEEK(4609))+CHR$
(PEEK(4610))+CHR$(HR)+CHR$(MN):P
OKE&H016B,16:POKE&H016C,205:TR=0
68 RUNT9810:EXEC&H10DA:TR=TR+1:I
F TR>3THEN9810ELSEPRINT:PRINT"US
ER # (0=NEW):";:GOSUB675:R5=VAL(
CH$):CH=R5:IF R5>1THEN110ELSE70
70 EXEC&H10DA:TR=TR+1:IF TR>3 TH
EN9810ELSEGOSUB9700:RUN T 70:CLO
SE:PRINT:PRINT:PRINT"ENTER FIRST
 AND LAST NAME":PRINT"NAME: ";:G
OSUB675:K=INSTR(CH$,CHR$(32)):IF
K=0ORCH$=""THEN70
71 NA$=CH$:IFLEN(NA$)>90THENPOKE
65387,106:RUN:ELSEIFLEN(NA$)<5TH
EN70
75 K=INSTR(CH$,";"):IFK>0THEN NA
$=LEFT$(CH$,K-1):CH$=RIGHT$(CH$,
LEN(CH$)-K):K=INSTR(CH$,";"):IFK
=0THEN LO$=CH$:GOTO90 ELSE LO$=L
EFT$(CH$,K-1):GOTO90
80 GOSUB9700:RUN T 80:PRINT"FROM
: ";:GOSUB 675:IFCH$=""THEN70ELS
E LO$=CH$
90 PRINT:PRINT:PRINT:PRINTTAB(5)
"NAME: ";NA$:PRINTTAB(5)"FROM: "
;LO$:PRINT:PRINTTAB(5)"CORRECT (
Y/N) ";
95 GOSUB625
100 IFCH$="N"THENPRINT"NO":GOTO7
0
105 IFCH$<>"Y"THEN95ELSE TR$=NA$
+CHR$(13)+LO$+CHR$(13):PRINT"YES
"
110 RUN T 900:PRINT:GOSUB9200:GE
T#1,1:C1=ASC(U7$):C2=ASC(U8$):CN
=C1*256+C2:PRINT:PRINT"CHECKING
USERLOG...";:IF R5>1THEN R=R5:IF
 R>LOF(1)THEN67ELSEGET#1,R:R6=R:
GOTO173
120 FOR R=2 TO LOF(1):GOSUB9700
130 GET#1,R:R6=R:K=INSTR(UN$,NU$
):IF LEFT$(UN$,K-1)<>NA$ THEN 17
0
140 L=INSTR(K+1,UN$,NU$):F$=MID$
(UN$,K+1,L-1-K):IF F$=LO$ THEN 1
80
150 PRINT:PRINT:PRINTLEFT$(UN$,K
-1):PRINT F$:PRINT"IS THIS YOU?
";:T=0:EXEC4314
160 GOSUB 625:IF CH$="Y" THEN PR
INT"YES":GOTO180
165 IFCH$<>"N"THEN160ELSEPRINT:P
RINT"USER NAME EXIST.  PLEASE EN
TER":PRINT"YOUR NAME A LITTLE DI
FFERENT":GOTO70
170 NEXT R:PRINT:IFPEEK(4680)>0T
HENPRINT"WRITING USER...":GOTO46
0ELSEPRINT"USER NOT FOUND":GOTO3
```

GRAFPLOT

TRY IT BEFORE YOU BUY IT!!

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DEMO!!

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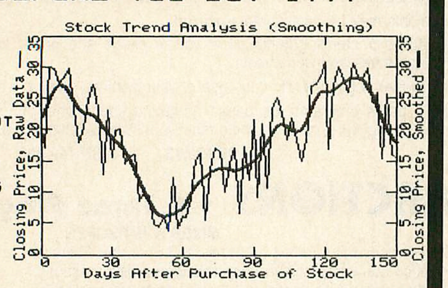

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```
00
173 IF UP$<>"        " THEN 180E
LSEPRINT"NO PASSWORD IN LOG.":PR
INT"PLEASE ENTER A PASSWORD OF U
P":PRINT"TO 8 CHARACTERS: ";
175 GOSUB655:IF CH$="" OR LEN(CH
$)>8 THEN PRINT"ENTER A PASSWORD
: ";:GOTO175
177 LSET UP$=CH$:GOTO210
180 IF UY=1 THEN 210 ELSE PRINT:
EXEC&H10DA:PRINT"PASSWORD: ";:A$
="":RUN T 180
190 EXEC4314:CH$=CHR$(PEEK(4481)
):IC$=INKEY$:IFIC$<>""THEN CH$=I
C$:GOTO191ELSEIFCH$=CHR$(0)THEN1
90
191 K=INSTR(CJ$,CH$):ON K+1 GOTO
192,200,193:GOTO190
192 A$=A$+CH$:IFPEEK(4679)>0THEN
PRINTCH$;:GOTO190ELSEPRINT"*";:G
OTO190
193 IFLEN(A$)>0THENA$=LEFT$(A$,L
EN(A$)-1):PRINTCH$;
194 GOTO190
200 R5=R0:PRINT:A$=LEFT$(A$+STRI
NG$(8,0),8):IF A$=UP$ THEN 210 E
LSE T=T+1:TR$=TR$+CHR$(13)+A$:IF
 T>2 THEN 9800 ELSE180
210 RUN T 900:TR$="":KK=INSTR(UN
$,NU$):NA$=LEFT$(UN$,KK-1):KL=IN
STR(KK+1,UN$,NU$):LO$=MID$(UN$,K
K+1,KL-1-KK):TR$=TR$+NA$+CHR$(13
)+LO$+CHR$(13)+A$:C2=C2+1:IFC2>2
55THEN C2=0:C1=C1+1:IFC1>255THEN
 C1=0:C2=C2+1
211 LSET U7$=CHR$(C1):LSET U8$=C
HR$(C2):CN=C1*256+C2:GOSUB9700:I
F UY=1 THEN LSET UM$=CHR$(0)
215 PUT#1,1:FORA=1TO10:PRINT:NEX
TA:PRINT"WELCOME ";NA$:PRINT"PLE
ASE WAIT....":GOSUB9400:PRINT:PR
INT
220 PR=ASC(UA$):F$=U1$:GOSUB4100
:P1$=F$:F$=U2$:GOSUB4100:C3=0:P2
$=F$:BC=ASC(UE$):LG=CVN(U5$):LM=
CVN(UM$):DB$=UD$:TI=ASC(UO$):UL=
VAL(UL$):LSET UD$=DT$:POKE 4618,
ASC(UE$):POKE4619,ASC(UO$)
230 LSET U7$=CHR$(C1):LSET U8$=C
HR$(C2):F$=UR$:GOSUB4100:R$=F$:L
G=LG+1:LSET U5$=MKN$(LG):LSET UM
$=MKN$(RE):IF UY=1 THEN LG=1
234 IFASC(UR$)>0THENPUT#1,R
235 PRINT"LOW SYSTEM MESSAGE";RS
:PRINT"HIGH SYSTEM MESSAGE";RE:G
OSUB9700
```

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```
236 FORA=1TO5:A(A)=ASC(MID$(DB$,
A,1)):NEXTA:C4=1:PRINT"LAST ON:"
;STR$(A(1));"/";RIGHT$(STR$(A(2)
),2);"/";RIGHT$(STR$(A(3)),2);"
";STR$(A(4));":";:A$=RIGHT$(STR$
(A(5)),2):IFVAL(A$)>9 THEN PRINT
A$ELSEMID$(A$,1,1)="0":PRINTA$
237 CN=C1*256+C2:PRINT"YOU ARE C
ALLER NUMBER";CN
240 PRINT"YOU HAVE LOGGED IN:";L
G" TIMES":PRINT"LAST MESSAGE REC
EIVED:";LM:PRINT:PRINT"YOU ARE A
UTHORIZED";ASC(UO$)*5;"MINUTES"
245 MW=0:IFLOF(1)<2THENPUT#1,2
250 CLOSE:PRINT"AS A ";:IFRIGHT$
(R$,1)="0"THENPRINT"NEW USER.":P
RINT:GOTO7000
255 IFMID$(R$,2,1)="1"THENPRINT"
REGISTERED USER #";R ELSEPRINT"P
ROBATIONARY USER."
259 PRINT:IFPEEK(4629)<4THEN9800
ELSEIFPEEK(4659)=0THEN UT=1:GOTO
7010
260 PRINT:PRINT:IFPEEK(4666)=0TH
EN292ELSEPRINT"CHECKING FOR MESS
AGES TO YOU.":CS$=NA$+NU$:GOSUB9
700:CLOSE:GOSUB9000:F=0:IFK1=0TH
ENCLOSE:GOTO293
265 FOR A=2 TO K1:GOSUB9700
266 EXEC&H10DA:CH=PEEK(4481):IFC
H=83ORCH=115THENPRINT"MESSAGE CH
ECK ABORTED.":GOTO292
267 GET#1,A:K=INSTR(H5$,CS$):IFK
=0THEN291ELSEK=INSTR(H5$,CHR$(0)
):L=INSTR(K+1,H5$,CHR$(0)):M=INS
TR(L+1,H5$,CHR$(0)):XX=L-K-1:IFX
X<1THEN N$=""GOTO268ELSEN$=MID$(
H5$,K+1,XX)
268 FR$=LEFT$(H5$,K-1):XX=M-L-1:
IFXX<1THENS$=""ELSES$=MID$(H5$,L
+1,XX)
269 IFN$<>NA$ THEN 291
270 '
271 M5$=STR$(ASC(H8$))
283 F$=H2$:GOSUB4100:RF$=F$:IFMI
D$(RF$,2,1)="1"ORMID$(RF$,3,1)="
1"THEN291
285 IFF3=0THENPRINT:PRINT"MESSAG
ES WAITING!":F3=1:PRINT:MW=1
287 IFMID$(RF$,1,1)="1"THENPRINT
"PRIVATE MESSAGE"
289 PRINT"#";CVN(H1$);" - ";:H8=
ASC(H8$):IFLEN(BN$(H8))=0THENPRI
NT"MENU #";M5$ ELSE PRINTBN$(H8)
;" -"
290 PRINT"FROM: ";FR$:PRINT"SUBJ
: ";S$:PRINT
291 NEXTA:IF MW=0 THEN PRINT"SOR
RY, NO MESSAGES FOR YOU.":CLOSE:
```

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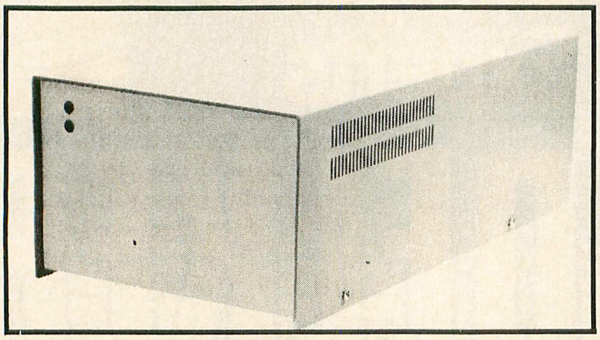

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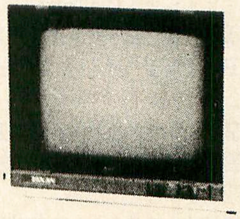

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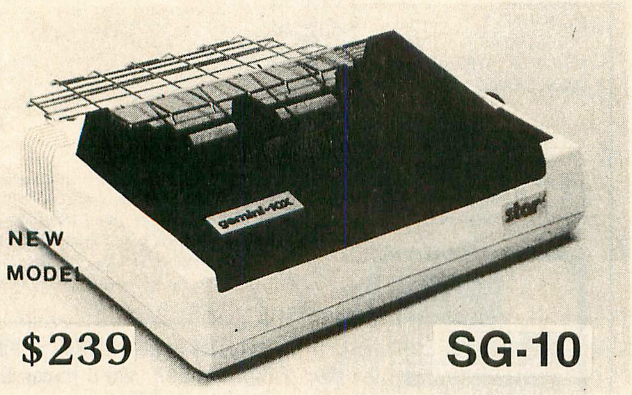

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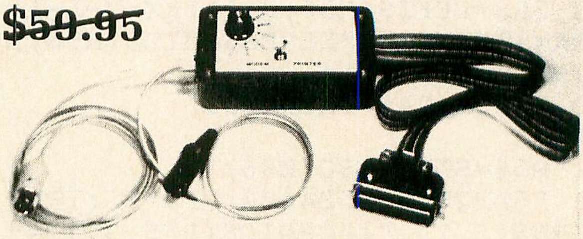

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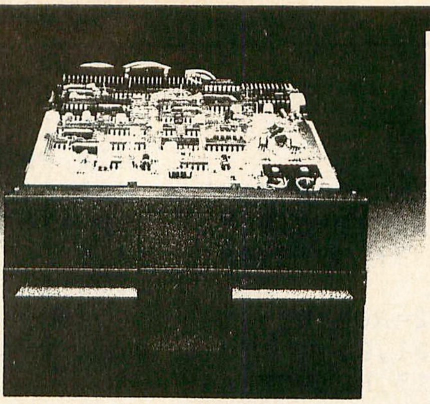

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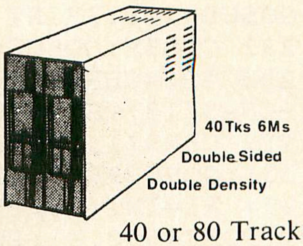

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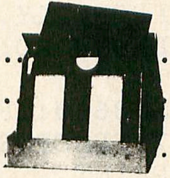

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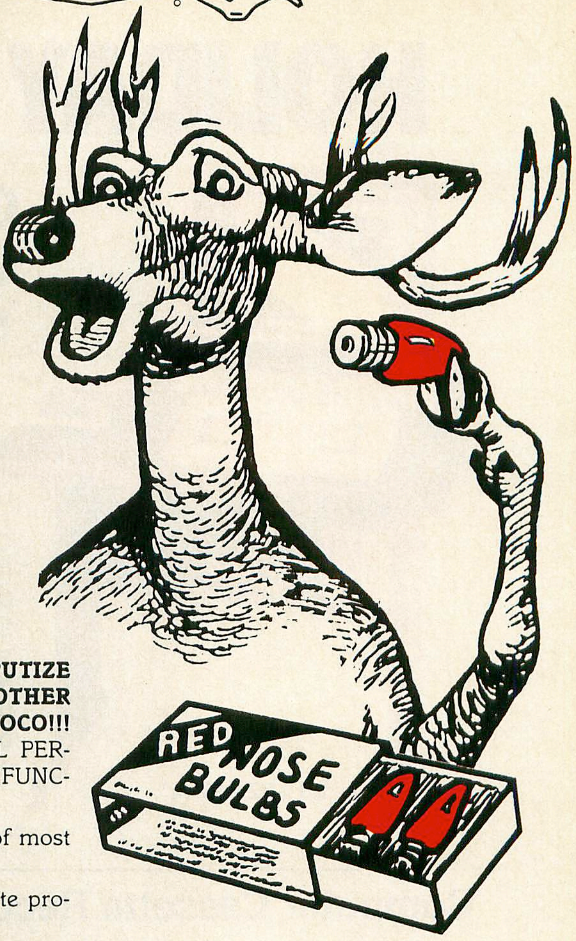
```
GOSUB9700:PRINT
292 CLOSE:GOSUB9700:PRINT
293 TR$=CHR$(13)+STRING$(20,"=")
+CHR$(13)+STR$(CN)+"  "+DA$+" "+
TI$+CHR$(13)+NA$+" / "+LO$+CHR$(
13):GOSUB9600:CLOSE
294 R1=INT(R6/256):R2=R6-(R1*256
):POKE4690,R1:POKE4691,R2
295 GOSUB9400:POKE4615,HR:POKE46
16,MN:POKE4617,S:PRINT:LOAD"COBB
S/SYS",R
300 '-NEW USER-
305 RUN T 900:IFPEEK(4629)<2THEN
9800
310 UY=0:'GOTO50000
315 PRINT:PRINT:PRINT:PRINT"SORR
Y, YOU ARE NOT ENTERED":PRINT"IN
 THE USER LOG."
320 '
335 PRINT:PRINT:PRINT"PLEASE LEA
VE THE FOLLOWING":PRINT"INFORMAT
ION.  ALL QUESTIONS":PRINT"MUST
BE ANSWERED TO BE REGISTERED"
340 PRINT:PRINT:GOSUB9700
345 PRINT"NAME: ";NA$:EXEC&H10DA
350 GOSUB9700:PRINT"ADDRESS: ";:
RUNT350
351 GOSUB650:IFCH$=""THEN350ELSE
 AD$=CH$
355 PRINT"CITY: ";LO$
360 GOSUB9700:PRINT" ZIP: ";:GOS
UB650:IFCH$=""THEN360ELSE ZP$=CH
$
365 PRINT:PRINT"PHONE: ";:RUNT36
5
366 GOSUB9700:GOSUB650:IFCH$=""T
HEN365ELSE PH$=CH$
370 PRINT:PRINT"ENTER A PASSWORD
 OF UP TO 8":PRINT"CHARACTERS.
NOTE: UPPER AND":PRINT"LOWER CAS
E IS TREATED DIFFERENTLY."
371 PRINT:PRINT"PASSWORD: ";:RUN
T371
372 GOSUB9700:GOSUB650:IFCH$=""O
RLEN(CH$)>8THEN371ELSEPW$=CH$
375 PRINT:PRINT:PRINT
380 PRINT"I HAVE IT AS:"
385 PRINTTAB(5)NA$:PRINTTAB(5)AD
$:PRINTTAB(5)LO$:PRINTTAB(5)PH$
390 PRINT:PRINTTAB(5)"PASSWORD:
";PW$:PRINT:PRINT
395 PRINTTAB(5)"IS THIS CORRECT
(Y/N)? ";
400 GOSUB9700:GOSUB600:IFCH$="Y"
ORCH$="y"THENPRINT"YES":GOTO430
405 IFCH$="N"ORCH$="n"THENPRINT"
NO"ELSE400
410 PRINT"NAME: ";:RUNT410
411 GOSUB9700:GOSUB675:IFCH$=""T
HEN410ELSENA$=CH$
415 PRINT"ADDRESS: ";:RUNT415
416 GOSUB650:IFCH$=""THEN415ELSE
AD$=CH$
420 PRINT"CITY, STATE: ";:RUNT42
0
425 GOSUB9700:GOSUB675:IFCH$=""T
HEN420ELSELO$=CH$:GOTO360
430 RUN T 460:FR=FREE(0):IFFR<2T
HEN460
450 OPEN"D",#2,"REGISTER/SYS",32
:FIELD#2,32 AS L$:K2=LOF(2):X$=S
TRING$(32,0):LSET L$=DA$+"  "+TI
$+X$:K2=K2+1:PUT#2,K2
455 K2=K2+1:LSET L$=NA$+X$:PUT#2
,K2:K2=K2+1:LSET L$=AD$+X$:PUT#2
,K2:K2=K2+1:LSET L$=LO$+X$:PUT#2
,K2:K2=K2+1:LSET L$=ZP$+X$:PUT#2
,K2:K2=K2+1:LSET L$=PH$+X$:PUT#2
,K2:K2=K2+1:LSET L$=PW$+X$:PUT#2
,K2
460 CLOSE:UNLOAD:GOSUB500
465 IFPEEK(4629)<3THEN9850ELSE21
0
500 '-LSET NON REGISTERED USER-
505 GOSUB9400:POKE4615,HR:POKE46
16,MN:POKE4617,0
510 GOSUB9700:RUN T 900:GOSUB920
0
515 LSET UN$=NA$+CHR$(0)+LO$+CHR
$(0):LSET UP$=PW$+STRING$(8,0)
520 LSET UR$=CHR$(0):LSET UA$=CH
R$(PEEK(4660)):LSET U1$=CHR$(PEE
K(4661)):LSET U2$=CHR$(PEEK(4662
))
525 LSET UU$=NU$:LSET UE$=CHR$(P
EEK(4664)):LSET U5$=MKN$(0):LSET
 UM$=MKN$(0)
530 LSET UD$=DT$:LSET U3$=NU$:LS
ET U4$=NU$:LSET UO$=CHR$(PEEK(46
63)):LSET UL$=CHR$(1)
535 LSET US$="    ":LSET SP$=""
540 IFFREE(PEEK(4572))<2THEN545E
LSE R=LOF(1)+1:PUT#1,R
545 RETURN
600 '-SINGLE KEY ENTRY
605 EXEC4314:CH$=CHR$(PEEK(4481)
):IC$=INKEY$:IFIC$<>""THEN CH$=I
C$:GOTO615
610 GOSUB9700:IF CH$=CHR$(0)THEN
605
615 RETURN
625 GOSUB605:CH=ASC(CH$)
```

Somethings Are Important Enough For A BACKUP!

- Rudolph
the reindeer

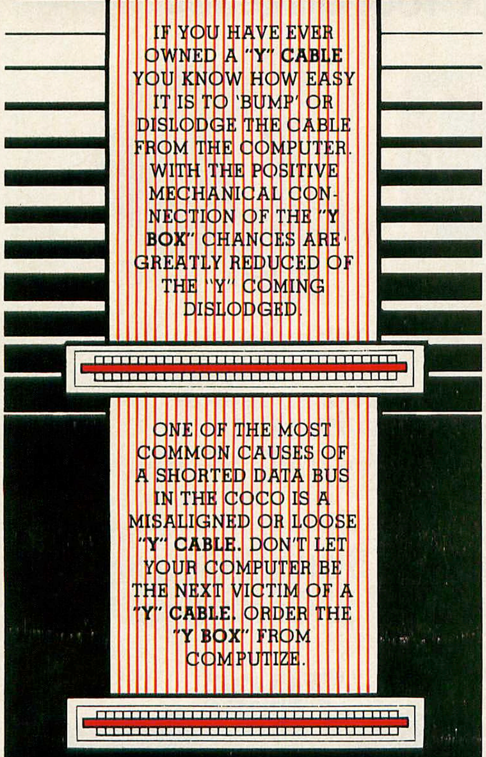
Merry Christmas



NEW

TRS-80 COLOR COMPUTER

Y BOX



IF YOU HAVE EVER OWNED A "Y" CABLE YOU KNOW HOW EASY IT IS TO 'BUMP' OR DISLODGE THE CABLE FROM THE COMPUTER. WITH THE POSITIVE MECHANICAL CONNECTION OF THE "Y BOX" CHANCES ARE GREATLY REDUCED OF THE "Y" COMING DISLODGED.

ONE OF THE MOST COMMON CAUSES OF A SHORTED DATA BUS IN THE COCO IS A MISALIGNED OR LOOSE **"Y" CABLE.** DON'T LET YOUR COMPUTER BE THE NEXT VICTIM OF A **"Y" CABLE.** ORDER THE **"Y BOX"** FROM COMPUTIZE.

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2. **TAPE TO DISK** (Move Cassette programs to Disk!)
3. **AUTO RELOCATE** (For those Cassette programs that conflict with Disk operating systems.)
4. **DISK TO TAPE** (Place Disk programs onto Cassette)
5. **DISK TO DISK** (Our powerful Split-N-Image Program, Copies regardless of protection schemes!)

- **MENU DRIVEN**
- **REQUIRES 32K EXTENDED COCO**
- **REQUIRES 1 OR 2 DRIVES**
- **ALL MACHINE LANGUAGE!!!**

COMPARE WITH OTHER INDIVIDUAL PROGRAMS COSTING IN EXCESS OF $100.00

DISK $49.95 . . . . Cat. No. 107CD

NEW MASTER KEY II

New Improved Version! A hardware product that takes control of any program regardless of protection. Now use with RS Multi-pak, "Y" cable or **optional** extender cable. Captures register contants as they were when Master Key II was engaged. Complete disassembler, memory save, and much more. Requires some familiarity with Assembly Language.

ROM PAK Cat. No. 160HR . . . . . $ 99.95
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See Page 289 For More Holiday Values

SPIT-N-IMAGE ©

M/L Disk Back-Up Utility

There is no need to suffer the heartbreak of crashed disks any longer. Spit-N-Image will create a mirror image of your valuable disk programs which do not respond to normal back-up functions. Will also initialize and back-up in one pass. Data processing experts always insist on having a back-up — it's good a practice.

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Transfer contents of disk to tape • Transfer contents of tape to disk • Automatically relocates cassette programs that conflict with the disk operating system • Displays machine language program addresses • Copies ASCII, Basic, & Machine Language Programs • All contained in 1 menu driven program!

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Cassette $19.95 . . . . . Cat. No. 105CT
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Computize INC.

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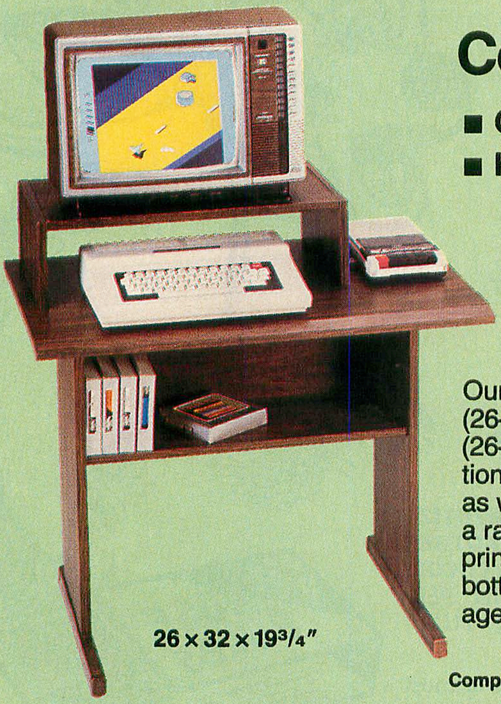


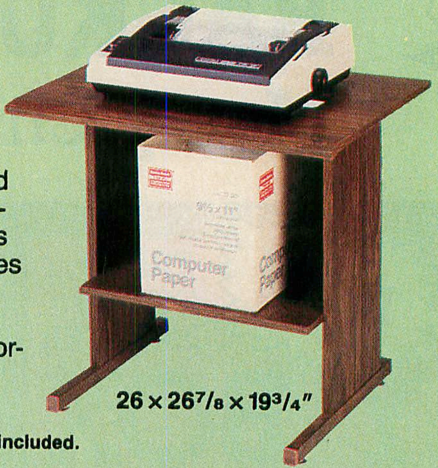
26 × 32 × 19 3/4″

Compact Computer Furniture

- **Good-Looking Simulated Hickory Finish**
- **Keeps Computer System Organized**

49^{95} Each

Our affordable Computer Stand (26-1354) and Compact Printer Stand (26-1355) are not only attractive additions to your home, but space savers as well. The Computer Stand includes a raised platform for a monitor or printer. The Printer Stand includes a bottom-feed paper slot and paper storage shelf.



26 × 26 7/8 × 19 3/4″

Computer, printer, monitor and accessories not included.

Computer Cassette Recorder

- **Built-In Automatic Level Control**
- **Recorder Starts and Stops Automatically**

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The CCR-82 recorder (26-1209) is ideal for loading and saving programs and data. It features cue/review and tape counter. Requires four "AA" batteries.

Protect Your Diskettes

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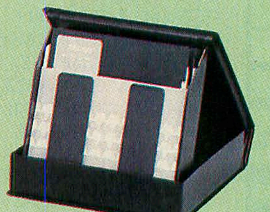

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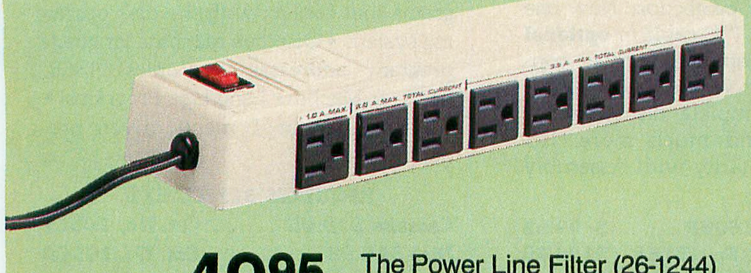
5 1/4″ **Wallet File.** Holds 10 diskettes. 26-1366, $7.95.

5 1/4″ **Library Box.** Stores like a book when closed. Holds 10 disks. 26-1452, $4.95.

5 1/4″ **Travel Tote (not shown).** Holds 5 disks. 26-1348, $2.95.

Power Line Filter



49^{95}

The Power Line Filter (26-1244) filters line noise from nearby appliances and reduces interaction between peripherals. It also protects equipment from damaging transient voltage spikes.

Low-Priced Joysticks

19^{95} Pair

Our lowest-priced joysticks (26-3008) make games even more exciting. Fast 360° movement!

Sound/Speech Cartridge

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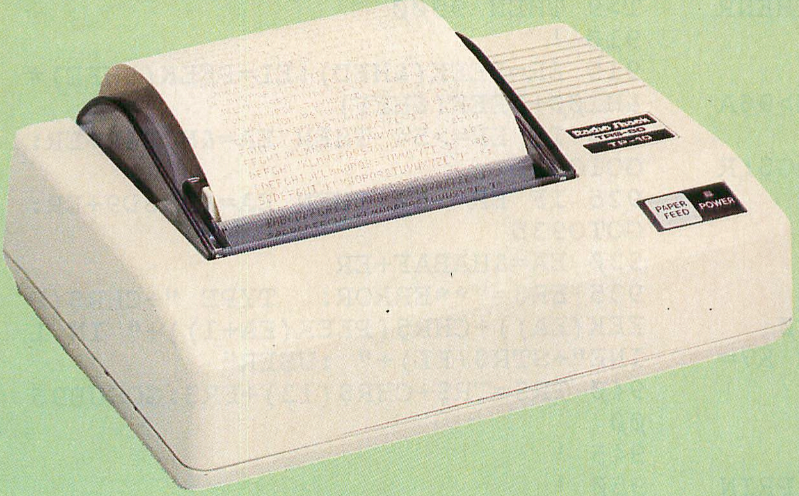
SPEECH-SOUND PAK
CAT. NO. 26-3144

Just plug the Cartridge (26-3144) into a Color Computer's Program Pak™ port for sound and speech.

COLOR COMPUTER OWNERS

Save $20 on a Thermal-Matrix Printer

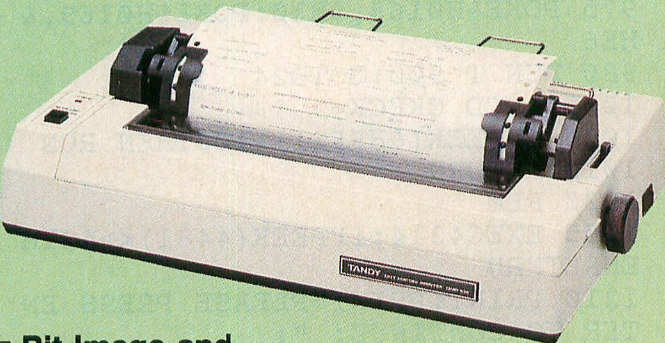


- **Ideal for the Color Computer 2**
- **Super-Quiet Operation**

Reg. 99.95 **79.95**

The TP-10 (26-1261) is a perfect match for your Color Computer! It prints both graphics and alphanumerics at 32 characters per line, 30 characters per second on 4 1/8″ wide thermal paper. Features include elongation mode for expanded print and a special repeat function to make graphics programming easier. Measures 3 × 8 × 5″. Color Computer-compatible serial interface only.

Low-Cost Dot Matrix Printer

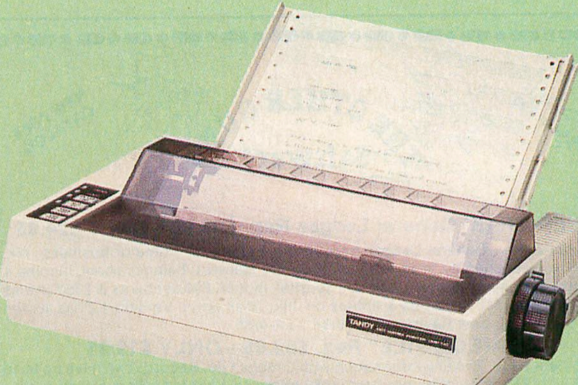


- **Bit Image and Graphics Mode**
- **Prints 80 Characters Per Second**

199.95

A Radio Shack price breakthrough! The DMP 105 (26-1276) prints crisp 8 × 9 dot matrix characters on an 8″ line. It's ideal for data processing and general-purpose use. Bi-directional—prints 80 or 132 characters on an 8″ line.

Triple-Mode Printer



- **Word Processing and Dot-Addressable Graphics**
- **Cursive and Microfont Styles**

349.95

The DMP 130 (26-1280) makes correspondence-quality printing affordable. It prints in four character styles: standard or italic cursive in draft or correspondence modes.

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

TP-10 Printer sale begins 10/22, ends 12/24/85. Prices apply at Radio Shack Computer Centers and participating stores and dealers.

```
630 IFCH>96ANDCH<123THEN CH=CH-3
2
635 CH$=CHR$(CH):RETURN
650 '-REMOTE INPUT  **KEYBOARD O
NLY
655 LINEINPUTCH$:GOSUB9700
665 RETURN
675 GOSUB655:G$="":IFCH$=""THENR
ETURN
680 FOR A=1 TO LEN(CH$)
685 G=ASC(MID$(CH$,A,1)):IFG>96A
NDG<123THEN G=G-32
690 G$=G$+CHR$(G):NEXTA:CH$=G$:R
ETURN
700 '-COMPARE FLAGS-
710 K7=0
720 FOR Q=1 TO 8
730 IFMID$(F$,Q,1)="0"THEN750
740 IFMID$(PX$,Q,1)<>"1"THEN K7=
1
750 NEXTQ:RETURN
800 '-SET TIME-
805 POKE65386,106:CLS:PRINT:PRIN
T:PRINT
810 INPUT"MM,DD,YY";MM,DD,YY
815 DC=VAL(HEX$(PEEK(&H0EFD))):P
OKE4611,DC
820 INPUT"HH:MM";HR,MN
825 X=USR1(HR*256+MN)
830 POKE4608,MM:POKE4609,DD:POKE
4610,YY
835 POKE65386,107
840 RETURN
900 '-ERROR ROUTINE-
905 RUN T 900:CLOSE:ET=ET+1:IF E
T>9 THEN 9900
910 '
915 ER=PEEK(&HFD):EL=PEEK(&HFE)*
&H100+PEEK(&HFF)
920 IF ER=>54 THEN EA=&HC242+ER:
GOTO935
925 IF ER=>50 THEN EA=&H88D9+ER:
GOTO935
930 EA=&HABAF+ER
935 ER$="**ERROR:  TYPE "+CHR$(P
EEK(EA))+CHR$(PEEK(EA+1))+" IN L
INE"+STR$(EL)+" :USER"
940 TR$=TR$+CHR$(13)+ER$:GOSUB96
00
945 '
950 '
955 '
960 TR$=TR$+CHR$(13):GOSUB9600
965 PRINT:POKE&H0168,PEEK(4681):
POKE&H0169,PEEK(4682)
970 PRINTER$:PRINT:FORA=1TO1000:
NEXTA
975 POKE&H0168,&H10:POKE&H0169,&
HE6
980 RUN T 900:GOTO24
1000 '-CD CKECK-
1005 IFPEEK(&HFF21)>100THEN RUN
1010 RETURN
1200 REM
1205 EXEC4314:IFPEEK(4481)<>42TH
ENRETURN
1210 PRINT:PRINT"PLEASE PRESS EN
TER TO CONTINUE: ";
1215 GOSUB650
1225 IF CH$=PW$ THEN II$=CHR$(95
):GOTO31
1230 RETURN
4100 '-DECIMAL TO BINARY
4105 F=ASC(F$):E=128:F$=""
4110 FOR Q=1 TO 8
4115 J=INT(F/E)
4120 IF J=0 THEN F$=F$+"0"ELSEF$
=F$+"1"
4125 F=F-(E*J):E=E/2
4130 NEXT Q
4140 RETURN
4200 '-BINARY TO DECIMAL
4205 W=LEN(F$):E=1:F=0
4210 FOR Q=W TO 1 STEP -1
4215 IFMID$(F$,Q,1)="1"THEN F=F+
E
4220 E=E*2:NEXTQ:F$=CHR$(F)
```

64k CoCo II Upgrade $20

THE OTHER GUY'S Software

NEW FREE CATALOG

'KEEP-TRAK' General Ledger Reg. $69.95—ONLY $24.95

"Double-Entry" General Ledger Accounting System for home or business: 16k, 32k, 64k. User-friendly, menu-driven. Program features: balance sheet, income & expense statement (current & 'YTD'), journal, ledger, 899 accounts & 2350 entries on 32k & 64k (710 accounts & entries on 16k) (disk only). Version 1.2 has screen printouts. Rainbow Reviews 1.1 - 9/84 : 1.2-4/85

"OMEGA FILE" Reg. $69.95—ONLY $19.95

Filing data base. File any information with Omega File. Records can have up to 16 fields with 255 characters per field (4080 characters/record). Sort, match & print any field. User friendly menu driven. Manual included (32k/64k disk only).
Rainbow Review 3/85, Hot CoCo 10/85

BOB'S MAGIC GRAPHIC MACHINE

Can generate BASIC code to use in your programs. Easy drawing and manipulation of circles, elipses, boxes, lines and ARCS. Single joystick operation with on line HELPS at all times. Allows text on the graphics screen & movement of objects on the screen. Can be used as a stand-alone graphics editor. Instruction Manual. **GRAPHICS EDITOR.Reg. $39.95—ONLY $19.95** for disk or tape. 64k ECB.
Rainbow Review 7/85, Hot CoCo 9/85 "**The graphics bargain of the year**"

'KEEP-TRAK' Accounts Receivable. (Avail. 10/01/85).

Features: auto interest calculation, auto ageing of accounts, installment sales, total due sales, explanation space as long as you need, detailed statements, 'KEEP-TRAK' General Ledger tie in, account number checking, credit limit checking & more. User friendly/menu driven. Includes manual. **$39.95** or **$49.95** General Ledger & Accounts Receivables. (Disk Only).

OS9 UTILITY DISK

Contains: Transfer utilities between RSDos and OS9 which also allows manipulation of RS files with OS9 programs. EXPANDABLE MULTILEVEL HELP. CPTREE—copies directory structures with no temp. files. Two calculators, plus ten other utilities. **$19.95** (Disk Only—Available 10/15/85) OS9 is Microware TM.

'COCO WINDOWS' Available 10/31/85

With hi-res character display and window generator. Features an enhanced key board (klicks) and 10 programmable function keys. Allows the user to create multiple windows from basic. Includes menu driven printer setup and auto line numbering. Four function calculator. with memory. The above options can be called anytime while running or writing in BASIC. APPLE PULL YOUR DRAPES, YOU DON'T WANT TO SEE THIS. **$19.95** (disk or tape) includes manual.

THE OTHER GUY'S SOFTware
P.O. Box H, 55 N. Main
Logan, UT 84321 (801) 753-7620

(Add $2.50 for postage & handling)
C.O.D., Money Order, Check in U.S. Funds
(Please specify if J&M controller)

```
4225 RETURN
7000 'NEWUSER/POSTLOG/TXT
7005 IFPEEK(4667)<>0THEN259ELSEF
$="NEWUSER/TXT:":GOTO7015
7010 IFPEEK(4659)<>0THEN260ELSEF
$="POSTLOG/TXT:"
7015 D=-1:CLOSE:UNLOAD
7020 D=D+1:IFD>3THEN7045
7025 FT$=F$+DR$(D):RUNT7020:OPEN
"I",#1,FT$
7030 RUNT7045:IFNOTEOF(1)THENLIN
EINPUT#1,S$ELSE7045
7035 EXEC&H10DA:CH$=CHR$(PEEK(44
81)):K=INSTR("pPSs",CH$):IFK>0TH
EN7050
7040 GOSUB9700:PRINTS$:GOTO7030
7045 CLOSE:UNLOAD:IFUT=1THEN260E
LSE259
7050 IFK>2THEN7045
7055 EXEC&H10DA:IFPEEK(4481)<>13
THEN7055ELSEPRINTS$
7060 GOTO7030
8000 '-SCREEN-
8005 RUN T 900
8010 POKE&H0168,PEEK(4681):POKE&
H0169,PEEK(4682)
8015 CLS3
8020 GOSUB9000:IFK1=0THEN8045
8025 GET#1,1:RE=CVN(H1$)
8030 GET#1,2:RS=CVN(H1$):XY=LOF(
1)-1
8040 HR$=RIGHT$(STR$(PEEK(4615))
,2):MN$=RIGHT$(STR$(PEEK(4616)),
2):TZ$=HR$+":"+MN$
8041 FOR Q=1 TO 4
8042 IFMID$(TZ$,Q,1)=" " THEN MI
D$(TZ$,Q,1)="0"
8043 NEXTQ
8045 CLOSE
8050 GOSUB9200:GET#1,1
8055 K=INSTR(UN$,CHR$(0)):N$=LEF
T$(UN$,K-1):L=INSTR(K+1,UN$,CHR$
(0)):L$=MID$(UN$,K+1,L-1-K):X=AS
C(U7$)*256+ASC(U8$):CA=LOF(1)-1
8060 PRINT@66,"COLOR BULLETIN BO
ARD SYSTEMS";
8065 PRINT@140,"<C> 1984";:PRINT
@167,"by RICHARD  DUNCAN";
8070 PRINT@228,"STARTING MESSAGE
:";RS;:PRINT@260,"  ENDING MESSA
GE:";RE;:PRINT@328,"CALLS: ";X;:
PRINT@360,"USERS: ";CA;
8075 NN$="LAST CALLER: "+N$:A=LE
N(NN$):IFA>32THEN B=0:GOTO8080 E
LSE B=INT((32-A)/2)
8080 GOSUB9400:PRINT@448+B,NN$;:
PRINT@490,"TIME: ";TZ$;
8085 POKE&H0168,&H10:POKE&H0169,
&HE6
8090 CLOSE:RETURN
8100 '-SYSTEM CONTROL FILE-
8105 DSKI$ 0,17,18,S1$,S2$:IFLEF
T$(S1$,5)<>"COBBS"THEN9925
8110 POKE4629,ASC(MID$(S1$,9,1))
8111 POKE4664,ASC(MID$(S1$,10,1)
)
8112 POKE4663,ASC(MID$(S1$,11,1)
)
8113 FOR A=0 TO 2:POKE4660+A,ASC
(MID$(S1$,12+A,1)):NEXT A
8114 POKE4628,ASC(MID$(S1$,15,1)
)
8115 POKE4666,ASC(MID$(S1$,16,1)
)
8116 POKE4669,ASC(MID$(S1$,17,1)
)
8117 POKE4679,ASC(MID$(S1$,18,1)
)
8118 POKE4680,ASC(MID$(S1$,19,1)
)
8119 POKE4667,ASC(MID$(S1$,20,1)
)
8120 POKE4659,ASC(MID$(S1$,21,1)
)
8121 POKE4694,ASC(MID$(S1$,22,1)
)
8122 FORA=0TO6:POKE4670+A,ASC(MI
```

SAILORS SYSTEM SOFTWARE

Get Your Favorite Teacher

CLASS.

$49.95

A Radio Shack Color Computer with 32-64K and Extended BASIC becomes an electronic grade book. CLASS. includes 7 programs and 2 data files to ease the entry, manipulation, and reporting of grades.

Grades entered may be letters or number correct. All entries are converted to, and stored as, percent scores. Individual incomplete grades are allowed. Each assignment or cumulative grade is assigned a weight. More than 2500 grades may be stored in memory. Any number of students and assignments that amounts to less than the memory limit is allowed, eg. 50 students with 50 assignments. The configuration may be modified later. As many as 1000 grades have been entered per hour during use.

Printed reports are confidential. Students are identified by number on the screen and printer. Accumulated average percent and grade are reported.

All information may be changed conveniently. Files compatible with Radio Shack's Colorstat may be created. Student names may be alphabetically sorted.

Sailors System Software
1943 N. Garfield Avenue
Pasadena, CA 91104

CLASS. on disk $49.95
CLASS. on cassette ... $50.00

```
D$(S1$,23+A,1)):NEXT A
8199 RETURN
8200 '-MENU NAMES-
8205 GOSUB9100
8210 FOR R=1 TO K2 STEP 4
8215 GET#2,R:BN$=M5$:BN=ASC(M1$)
8220 K=INSTR(BN$,NU$):IFK=0THEN
K=LEN(BN$)+1:BN$(BN)=LEFT$(BN$,K
-1)
8225 BN$(BN)=LEFT$(BN$,K-1):NEXT
 R:BN$(255)="SYSOP MSG"
8230 CLOSE:RETURN
9000 '-OPEN HDR/SYS-
9005 RUNT9900:FF$="HDR/SYS:"+DR$
(PEEK(4670))
9010 OPEN"D",#1,FF$,110
9015 FIELD#1,5 AS H1$,1 AS H2$,3
 AS H3$,2 AS H4$,80 AS H5$,5 AS
H6$,5 AS H7$,1 AS H8$,8 AS SP$
9020 K1=LOF(1):RETURN
9100 '-OPEN BOARD MENU-
9105 FF$="MENU/SYS:"+DR$(PEEK(46
73))
9110 OPEN"D",#2,FF$,250
9115 FIELD#2,1 AS M1$,1 AS M2$,1
 AS M3$,1 AS M4$,16 AS M5$,230 A
S M6$
9120 K2=LOF(2):RETURN
9200 '-OPEN USERLOG-
9205 FF$="USERL/SYS:"+DR$(PEEK(4
672))
9210 OPEN"D",#1,FF$,96
9215 FIELD#1,50 AS UN$,8 AS UP$,
1 AS UR$,1 AS UA$,1 AS U1$,1 AS
U2$, 1 AS UU$,1 AS UE$,5 AS U5$,
5 AS UM$,5 AS UD$,1 AS U3$,1 AS
U4$,1 AS UO$,1 AS UL$,4 AS US$,1
 AS U7$,1 AS U8$,7 AS SP$
9220 KX=LOF(1):K1=KX-1:RETURN
9400 '-GET TIME-
9405 DC=VAL(HEX$(PEEK(&H0EFD))):
HR=VAL(HEX$(PEEK(&H0EFE)))
9410 MN=VAL(HEX$(PEEK(&H0EFF))):
SS=VAL(HEX$(PEEK(&H0F00)))
9415 HR$=RIGHT$(STR$(HR),2):IFHR
<10THEN MID$(HR$,1,1)="0"
9420 MN$=RIGHT$(STR$(MN),2):IFMN
<10THEN MID$(MN$,1,1)="0"
9425 TI$=HR$+":"+MN$:IF SS<57 OR
 MN>58  THEN 9440
9430 MN=MN+1:IF MN>59 THEN MN=0:
HR=HR+1:IF HR>23 THEN HR=0
9435 X=USR0(HR*256+MN)
9440 X=PEEK(4611):IF X<>DC THEN
9455
9445 DA$=RIGHT$(STR$(PEEK(4608))
,2)+"/"+RIGHT$(STR$(PEEK(4609)),
2)+"/"+RIGHT$(STR$(PEEK(4610)),2
)
9450 RETURN
9455 MM=PEEK(4608):DA=PEEK(4609)
:YY=PEEK(4610):DA=DA+1:IFDA>31TH
EN DA=1:MM=MM+1:IF MM>12 THEN MM
=1:YY=YY+1
9460 POKE4608,MM:POKE4609,DA:POK
E4610,YY:POKE4611,DC:GOTO9445
9600 '-TRACER-
9605 CLOSE:FF$="TRACER/SYS:"+DR$
(PEEK(4675))
9610 FR=PEEK(4669):IFFR=0THEN962
5ELSEIFFR=1THEN9640ELSEIFFR=3THE
N9660ELSERUNT9630:OPEN"D",#1,FF$
,128
9615 FIELD#1,128 AS X$:K1=LOF(1)
9620 LSET X$=TR$:K1=K1+1:PUT#1,K
1
9625 CLOSE:TR$="":RETURN
9630 POKE4669,0:GOTO295
9640 OPEN"O",#-1,"TRACER":WRITE#
-1,TR$:GOTO9625
9660 PT=PEEK(&HFF22)AND1:IFPT=1T
HEN9625ELSEPRINT#-2,TR$:GOTO9625
9700 '-CD CHECK-
9705 IFPEEK(4658)=0THEN9740
9710 CD=PEEK(65385)AND32
9715 IF CD<>0 OR PEEK(4657)<>0 T
HEN9750
```

(COLOR LISP)

Experiment in the exciting world of Artificial Intelligence on your **COLOR** computer with this **LISP** interpreter.

This is a powerful but minimumly implemented **LISP** interpreter that includes the following commands:

LISP — EVAL, CAR, CDR, LIST, CONS, NULL, ATOM, EQ, COND, PUT, GET, SETQ, OBLIST, READ, PRINT, PROG, PROGN, GO, RETURN, NUMBERP, ZEROP, GREATERP, LESSP, +, -, GC, MAPCAR, RPLACA, RPLACD

GRAPHICS — CLS, SET, POINT

CASSETTE — LOAD, SAVE, CLOSE, LOADWS, SAVEWS, AUDIO, MOTOR, SKIPF

MISCELLANEOUS — BASIC, PRINTER, PEEK, POKE, USR, SOUND, JOYSTK, FIRE(BUTTON)

SUPPORTS: Recursion, Property Lists, Garbage Collection, FEXPRs, EXPRs, machine language subroutines, low resolution graphics, interger numbers, long error messages, LISP objects stored on cassette, node and stack area can be reconfigured.

Requires a 32K Radio Shack Color Computer with Extended BASIC.

Price: $39.95 (cassette only) plus $2.00 shipping and handling ($5.00 foreign). VT residents add 4% sales tax. Send check or money order.

RAINBOW CERTIFICATION SEAL

VISA

FROST BYTE
P.O. Box 169
Underhill, VT. 05490-0169

MasterCard

```
9740 RETURN
9750 CLOSE:RUN
9800 '-TERMINATE-
9805 GOSUB9600
9810 CLOSE:POKE65386,106:RUN
9850 PRINT"THANKS FOR CALLING Co
BBS.":PRINT"WE WILL CONTACT YOU
SHORTLY"
9855 PRINT"TO UPGRADE YOUR ACCES
S."
9860 GOTO9800
9900 '-UNABLE TO ACCESS-
9904 GOTO900
9905 H$="PASSWORD"
9910 POKE65386,106:FORT=1TO100:N
EXTT
9915 POKE65386,107
9920 IFPEEK(65385)AND32<>0THEN99
20
9925 FOR A=1 TO 5:PRINT:NEXTA
9926 GOTO900
9930 PRINT"THANKS FOR CALLING...
":PRINT:PRINT"WE ARE UNABLE TO A
CCESS THE"
9935 PRINT"SYSTEM PROPERLY AT TH
IS TIME.":FORT=1TO500:NEXTT
9940 PRINT:PRINT:PRINT
9945 PRINT"PLEASE CALL AGAIN LAT
ER.":PRINT:FORT=1TO1000:NEXTT
9950 PRINT"PLEASE HANG UP.":PRIN
T:PRINT:GOSUB675:IFCH$=H$ THEN I
I$=CHR$(95):GOTO31
9955 GOTO9900
10000 POKE65386,106
10005 IFPEEK(4684)<>188THENPOKE&
HAC7D,&H0E:POKE&HAC7E,&H00
10015 MOTOROFF
10020 X=&H112B:POKE X,&H86:POKE
X+1,&H0D:POKE X+2,&HB7:POKE X+3,
&H11:POKE X+4,&H81:POKE &H1127,&
H10
10025 RUN
```

```
100 ......148
210 ......150
300 ......203
480 ......246
END ......87
```

Listing 3: COTERM

```
10 '-CREATES COTERM/BIN FOR COBB
S
20 DATA 204,126,57,231,140,250,4
8,141,0,21,246,1,148,254,1,149,2
31,141,0,30
30 DATA 239,141,0,27,183,1,148,1
91,1,149,57,31,169,53,64,129,84,
39,16,52
40 DATA 64,52,4,198,57,247,1,142
,53,1,126,255,255,255,255,157,15
9,189,175,103
50 DATA 198,57,247,1,142,220,43,
39,21,189,173,1,37,17,175,141,25
5,231,48,141
60 DATA 0,12,191,1,143,198,126,2
47,1,142,57,126,174,210,134,57,1
83,1,142,158
70 DATA 104,48,1,39,241,215,253,
220,104,221,254,189,173,51,174,1
41,255,191,189,174
80 DATA 187,126,173,158,255,0,25
5,0,0,77,39,5,204,255,255,32,65,
189,179,237
90 DATA 77,38,245,193,3,34,241,2
47,14,0,142,0,234,236,129,52,6,1
40,0,240
100 DATA 38,247,182,14,0,151,235
,142,160,0,159,238,134,2,151,234
,48,141,0,7
110 DATA 52,16,50,122,189,214,11
2,142,0,234,53,6,237,129,140,0,2
40,38,247,230
120 DATA 132,79,126,180,244,0,25
5,0,22,0,145,22,0,159,22,1,9,22,
1,178
130 DATA 79,106,141,0,32,46,100,
```

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  - shell forking
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```
48,141,0,26,134,120,167,132,166,
130,45,88,139
140 DATA 1,25,167,132,161,6,45,2
8,111,132,32,239,255,255,255,255
,255,0,0,7
150 DATA 36,96,96,0,255,0,255,0,
106,140,242,141,203,110,156,243,
230,140,230,88
160 DATA 88,48,141,0,43,58,198,4
,206,4,20,189,165,154,48,140,213
,141,10,134
170 DATA 58,167,192,141,4,134,58
,167,192,166,132,68,68,68,68,138
,48,167,192,166
180 DATA 128,132,15,138,48,167,1
92,57,19,21,14,32,13,15,14,32,20
,21,5,32
190 DATA 23,5,4,32,20,8,18,32,6,
18,9,32,19,1,20,32,189,179,237,7
7
200 DATA 45,3,231,140,144,79,230
,140,140,189,180,244,57,140,32,5
5,190,255,248,238
210 DATA 1,239,140,135,51,140,13
7,239,1,52,2,182,255,3,138,1,183
,255,3,206
220 DATA 1,106,166,196,174,65,16
7,141,255,111,175,141,255,108,13
4,126,48,141,0,148
230 DATA 167,196,175,65,134,18,1
67,140,200,53,2,189,179,237,77,4
5,22,52,4,141
240 DATA 26,231,141,255,65,53,2,
141,18,231,141,255,58,111,141,25
5,55,28,239,236
250 DATA 141,255,47,189,180,244,
57,95,140,203,16,128,10,44,250,1
39,10,52,2,234
260 DATA 224,57,189,179,237,52,4
,141,234,231,141,0,60,53,2,141,2
26,231,141,0
270 DATA 53,26,16,182,255,32,133
,1,38,249,142,7,208,48,31,39,44,
182,255,32
280 DATA 133,1,39,245,23,254,205
,236,141,254,235,16,163,141,0,17
,39,17,173,159
290 DATA 160,0,39,215,31,137,79,
189,180,244,28,239,57,0,255,79,9
5,189,180,244
300 DATA 57,204,255,255,189,180,
244,57,50,98,23,254,204,15,112,1
3,111,16,38,0
310 DATA 70,52,20,174,141,254,18
8,191,1,13,134,239,167,159,0,136
,182,255,32,133
320 DATA 1,38,249,142,7,208,48,3
1,39,31,182,255,32,133,1,39,245,
23,254,112
330 DATA 173,159,160,0,39,226,19
8,96,231,159,0,136,48,141,254,14
4,191,1,13,53
340 DATA 148,48,141,254,135,191,
1,13,126,161,179,126,161,127,0,2
55,67,48,141,0
350 DATA 81,188,1,104,39,50,182,
1,103,167,141,0,218,190,1,104,17
5,141,0,212
360 DATA 182,1,106,167,141,0,207
,190,1,107,175,141,0,201,134,126
,183,1,106,183
370 DATA 1,103,48,141,0,36,191,1
,104,48,141,0,4,191,1,107,57,15,
112,13
380 DATA 111,16,38,0,169,127,255
,64,50,98,141,44,129,3,38,2,134,
42,183,17
390 DATA 129,57,52,2,18,18,18,18
,18,18,18,18,18,18,150,111,53,2,
16,38
400 DATA 0,129,141,62,18,18,18,1
8,18,18,18,18,18,18,32,115,52,21
,26,80
410 DATA 173,159,160,0,39,2,32,3
6,182,255,105,132,8,39,6,182,255
,104,183,17
420 DATA 129,246,255,105,196,32,
```

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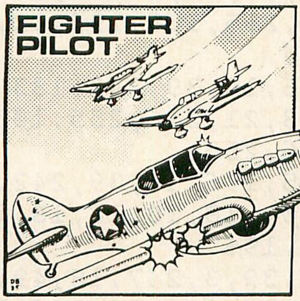

Fighter Pilot

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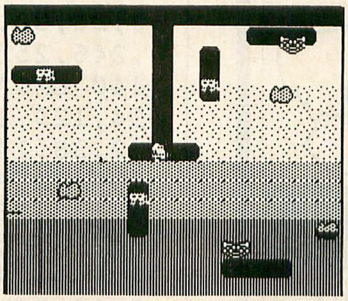

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You'll dig this 100% machine language arcade game! The Pumpman carries a pump that he fires at aliens Pooky and Dragon as they change forms and chase him around under the ground. 15 different screens, "pause game" feature. As fun and challenging as the original arcade version! 32K, one joystick required.

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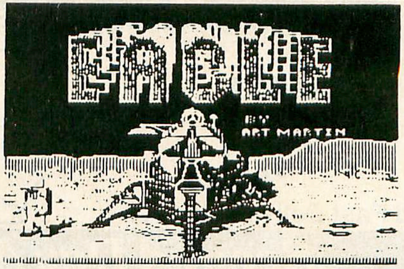

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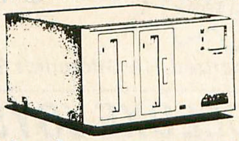

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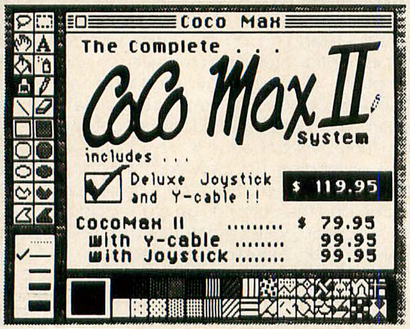
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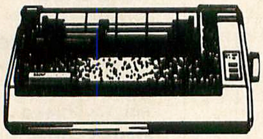

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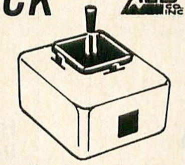

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```
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8,18,18,18
430 DATA 18,18,18,18,53,149,52,2
3,26,80,246,255,105,196,32,38,35
,246,255,105
440 DATA 196,16,39,242,183,255,1
04,129,13,38,21,246,255,105,196,
32,38,14,246,255
450 DATA 105,196,16,39,242,134,1
0,183,255,104,18,18,18,18,18,
246,255,105,196
460 DATA 32,39,3,247,18,49,53,15
1,18,18,18,126,203,74,126,197,14
3,13,80,1
470 DATA 103,134,68,69,86,78,85,
77,0,111,0,255,0,255,0,255,0,255
,0,255
480 DATA 0,255,0,255,0,255,0,255
,0,255,0,255,0,255,0,255,0,255,0
,255
490 DATA 0,255,0,255,0,255,0,255
,0,255,0,255,0,255,0,255,0,255,0
,255
500 DATA 0,255,0,255,0,255,0,255
,0,255,0,255,0,255,0,255,0,255,0
,255
510 DATA 0,255,0,255,0,255,0,255
,0,255,0,255,0,255,0,255,0,255,0
,255
520 DATA 0,255,0,255,0,255,0,255
,0,255,0,255,0,255,0,255,0,255,0
,255
530 DATA 0,255,0,255,248
540 DATA END
550 A= 3584
560 READ B$:IF B$="END" THEN 580
570 POKE A,VAL(B$):A=A+1:GOTO  5
60
580 PRINT"SAVING  COTERM/BIN"
590 SAVEM"COTERM/BIN",&H0E00,&H1
220,&H1091
```

One-Liner Contest Winner . . .

This one-liner draws a nicely detailed picture of a comet.

The listing:

```
10 PMODE4:SCREEN1,1:PCLS1:FORX=1
TO139:U=U+0.099:CIRCLE(128,192),
X,0,U:LINE(95+U*4,0)-(128,175),P
SET:CIRCLE(128,175),U*1.2:NEXT:P
OKE178,2:DRAW"BM214,180D5BR8U5L4
D3R4U3BR4D5R4U3L4R4U2L4BR8D5R4U3
L4":FORX=0TO1STEP-0:NEXT
```

Raymond Larabie
Whitelake, Ontario

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

32K
ECB

Which Award Is Which?

This "generic" program, easily modified to individual needs, is designed to keep track of various awards for Ham radio operators

By Burt B. Witham, Jr.

Ham radio operators like to earn awards for operating their stations and confirming contact with other amateur radio stations all over the world. There are literally hundreds of awards offered by various radio publications, organizations and clubs. It would be impossible to outguess the Hams and create a program to record individual desires insofar as award types, so I have designed a "generic" program that can be modified to suit the individual's needs.

(Burt Witham, holder of amateur radio license W4CNZ, has authored several programs for the Color Computerist who is also a "Ham." Burt retired from the U.S. Navy in 1973 as a captain after 31 years of service. He lives in Virginia Beach, Va.)

Awards includes a few of the most popular awards as examples. The program lines 10-40 initialize the program and present a menu for selection of the award data to be read. The program sections 100, 300, 400, 600 and 700 each present the data on a selected award. Since the data entries, or changes, occur at irregular intervals (often months apart), it was decided to store the data in DATA statements and have it read by the main program. This makes it easy to use and does not require disk or tape I/O functions. Thus, the program can be used with either tape or disk, as is, without modification.

Each award section consists of a simple data READ function and a screen printout of the required award data. Adding to or revising the data merely requires a rewrite of the appropriate DATA statement for BASIC (or an edit of the statement for Extended BASIC).

When revising these statements, be very careful to maintain the position of all of the commas, as they are the separators between the parts of the DATA statements. Changing their position causes the READ function to error. Several DATA statements have been filled in with "dummy" information (lines 750-790 and Line 810) to demonstrate how to record DATA in the data lines. The dummy information should be replaced with your own real information.

Using this program, the amateur operator can quickly and easily "let CoCo do it," and determine his status in earning any of the current awards desired.

Awards uses 12K of memory and Extended BASIC. It is available on disk or tape from the author at P.O. Box 2072, Virginia Beach, VA 23452, or through RAINBOW ON TAPE. ☐

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We will tell you which shows the critics themselves will be taping on the networks and cable, along with tips from the experts on how to get the best possible reproductions. And you can turn to us for the answers to your questions, ranging from the trivial to the technical.

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```
120 ......172
210 ......191
380 ......125
620 ......130
760 .......36
830 ......189
END .......7
```

The listing: AWARDS

```
1 REM *************************
2 REM *   HAM AWARDS RECORD     *
3 REM * BY BURT WITHAM  W4CNZ *
4 REM *    3501 SEA GULL RD.  *
5 REM *VIRGINIA BEACH,VA.23452*
6 REM *    (804)-340-2628     *
7 REM * VERSION 1.2   2/25/85 *
8 REM *  ALL RIGHTS RESERVED  *
9 REM *************************
10 DIMS$(50),D$(300),C$(300),QS$
(300),QR$(300),CN$(6):G=484:G$="
PRESS <ENTER> FOR MENU.":GOTO30
20 A$=INKEY$:IFA$=""THEN20ELSEIF
A$=CHR$(13)THENCLS:RETURNELSESOU
ND5,5:GOTO20
30 CLS6:PRINT@104,"AWARDS RECORD
S";:FORT=1TO999:NEXT:CLS:PRINT@3
9,"MAIN MENU":PRINT@97,"1) WAS":
PRINT" 2) WAZ":PRINT" 3) DXCC":P
RINT" 4) WAC":PRINT" 5) EXIT":PR
INT:INPUT" SELECT  1-5";N
40 IF N<1 OR N>5 THEN10ELSEON N
GOTO100,300,500,600,700
100 REM ** WAS
110 CLS:PRINT@33,"DO  YOU  WANT
 TO  REVIEW  ALL STATES OR  DO
YOU  WANT  A     PARTICULAR  STA
TE ....(A)/(P)    ";:INPUTZ$
120 IFZ$="A" THEN130ELSEIFZ$="P"
 THEN170ELSE110
130 CLS:PRINT@3,"WORKED ALL STAT
ES RECORD":PRINT:PRINT"STATE--DA
TE---STATION---QSL/S--R":FORS=1T
O50:READS$(S):NEXT:FORR=1TO50:RE
ADD$(R),C$(R),QS$(R),QR$(R):NEXT
140 FORP=1TO50:IFQR$(P)="Y"THENS
OUND200,2
150 PRINT" "S$(P);TAB(5)"-"D$(P)
;TAB(14)"-"C$(P);TAB(24)"-"QS$(P
);TAB(29)"-"QR$(P):FORTD=1TO600:
NEXTTD,P
160 RESTORE:GOTO30
170 CLS:PRINT@33,"ENTER TWO LETT
ER ABBREVIATION  OF STATE DESIRE
D.":INPUTST$:FORS=1TO50:READS$(S
):NEXT:FORN=1TO50:IFST$=S$(N)THE
N190ELSENEXT
180 SOUND5,10:CLS:PRINT@33,"NOT
FOUND- WRONG ABBREVIATION?  TRY
AGAIN!":RESTORE:FORTD=1TO999:NEX
T:GOTO170
190 FORW=1TO50:READD$(W),C$(W),Q
S$(W),QR$(W):IFW=N THEN200ELSENE
XT
200 CLS:PRINT@33,"WORKED ALL STA
TES RECORD":PRINT:PRINT"STATE--D
ATE---STATION---QSL/S--R":PRINT:
PRINT" "S$(N);TAB(5)"-"D$(W);TAB
(14)"-"C$(W);TAB(24)"-"QS$(W);TA
B(29)"-"QR$(W)
210 PRINT@G,G$;:GOSUB20
220 RESTORE:GOTO30
300 REM **WAZ
310 CLS:FORS=1TO50:READS$(S):NEX
T:FORK=1TO50:READD$(K),C$(K),QS$
(K),QR$(K):NEXT:PRINT@33,"DO  YO
U  WANT  TO  REVIEW  ALL ZONES O
R  DO  YOU  WANT  A      PARTICU
LAR  ZONE ....(A)/(P)    ";:INPUT
B$
320 IFB$="A"THEN330ELSEIFB$="P"T
HEN370ELSE310
330 CLS:PRINT@5,"WORKED ALL ZONE
S RECORD":PRINT:PRINT" ZONE--DAT
E---STATION---QSL/S-/R":FORZ=1TO
40:READD$(Z),C$(Z),QS$(Z),QR$(Z)
:NEXT
340 FORP=1TO40:IFQR$(P)="Y" THEN
SOUND200,2
350 PRINT" "P;TAB(5)"-"D$(P);TAB
(14)"-"C$(P);TAB(24)"-"QS$(P);TA
B(29)"-"QR$(P):FORTD=1TO600:NEXT
TD,P
360 GOTO30
370 CLS:PRINT@33,"ENTER NUMBER O
F ZONE DESIRED.":INPUTN:IF N<1 O
R N>40THENSOUND5,5:GOTO370
380 FORZ=1TO40:READD$(Z),C$(Z),Q
S$(Z),QR$(Z):NEXT:FORZN=1TO40:IF
ZN=N THEN390ELSENEXTZN
390 CLS:PRINT@33,"WORKED ALL ZON
ES RECORD":PRINT:PRINT" ZONE--DA
TE---STATION---QSL/S--R":PRINT:P
RINT" "ZN;TAB(5)"-"D$(ZN);TAB(14
)"-"C$(ZN);TAB(24)"-"QS$(ZN);TAB
(29)"-"QR$(ZN)
400 PRINT@G,G$;:GOSUB20
410 RESTORE:GOTO30
500 REM **DXCC
510 CLS:FORS=1TO50:READS$(S):NEX
T:FORK=1TO90:READD$(K),C$(K),QS$
(K),QR$(K):NEXT
520 CLS:PRINT@5,"WORKED DXCC REC
ORD":PRINT:PRINT" NR.---DATE---S
TATION---QSL/S-/R":FORZ=1TO130:R
```

GREAT COCO PRODUCTS

SUPER PRO KEYBOARD

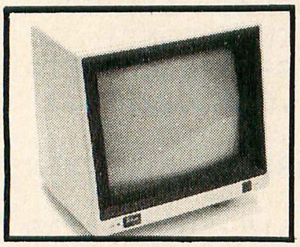
WHY PAY MORE?

The best is only $59.95*

- Original key layout
- Fast, easy installation—no soldering
- Individually boxed with full instructions
- Smooth "Touch Typist" feel—no sagging
- U.S. made—high quality, quad gold contacts
- Professional, low profile, finished appearance

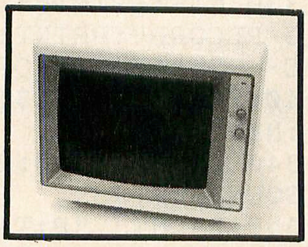
* Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add $3.95.

QUALITY VIDEO MONITORS



SAKATA COLOR SC-100 $199.95

The SC-100 is a streamlined 13" composite monitor which produces sharp, brilliant colors. The cabinet is made of durable styrene and is available in an attractive off-white color. Includes audio with speaker and earphone jack. We highly recommend this color monitor because of its excellent performance and beautiful styling.



CAMBRIDGE GRAPHICS AMBER SCREEN MONITOR $119.95

A 12" amber screen composite monitor of the highest quality with exceptional reliability and performance. 18 MHZ bandwidth. Attractive off-white cabinet. We use this monitor in our offices.

We carry other brands also. Call for additional information.

Order a quality monitor from us and get a Universal Video Driver for only $24.95 **Save $5.00**

SERIAL TO PARALLEL PRINTER INTERFACE

300 to 9600 baud. Complete with all cables and power supply.

NEW ITEM

Only $49.95

NEED MORE MEMORY? 64K Memory Expansion Kit

All parts and complete instructions (for 'E' and 'F' boards and CoCo II).

NOW ONLY $14.95

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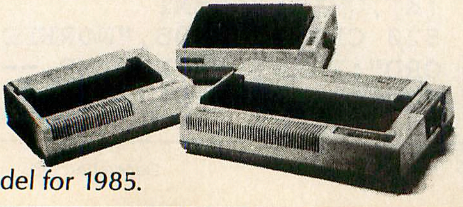
star

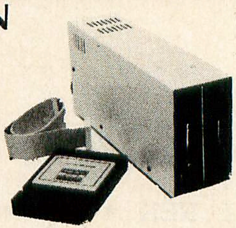
NEW Star Gemini SG-10 model printer

Only $249.95

120 cps w/true descenders, 2K buffer, proportional spacing. New model for 1985.



GREAT BARGAINS ON COCO DISC DRIVES!



COMPLETE SYSTEMS INCLUDE:

- Hi-Quality Teac Thin Line Drives
- Attractive, Beige Dual Drive Cabinet/Power Supply
- Fill Panel for Single Drive Disc Systems
- Radio Shack or NEW TYPE J & M Disc Controller Offering Switch Selectable Roms and Parallel Printer Port
- Cable and Operating Manual
- Full 90 Day Warranty

Single Drive (SSDD) in Dual Cabinet w/Controller	**$299.95**
Additional Drive	**89.95**
Two Drives (SSDD) in Dual Cabinet w/Controller	**384.95**
Single Drive (DSDD) in Dual Cabinet w/Controller	**339.95**
Additional Drive	**119.95**
Two Drives (DSDD) in Dual Cabinet w/Controller	**449.95**
Dual Cabinet/Power Supply	**79.95**
Disc Controller (Radio Shack or J & M)	**139.95**
Connecting Cable	**24.95**
Radio Shack DOS ROM 1.1 or J/DOS w/Manual	**39.95**

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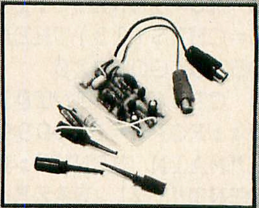
- Works with Monochrome Monitors
- Works with Color Monitors
- Easy Installation—No Soldering



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$ Save Money on Your Cassette & Disc Supplies $

We buy cassettes and discs in large quantities for our own use and can pass the savings on to you.

C-10 Cassettes w/labels	.59 ea	10 for $5.50
Cassette storage box	.25 ea	10 for 2.00

Basic 1.2 ROM	$39.95
Extended 1.1 ROM w/Manual	49.95
Disc 1.1 ROM or J/DOS ROM w/Manual	39.95

5¼ Discs

High quality, nationally advertised brand. *Guaranteed Performance.* We will replace any disc that fails during normal use. Discs are double density, reinforced hub with sleeve. $12.95 for 10 discs in an attractive storage box. **• Great Price!**

NEW!

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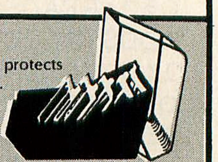
Attractive, heavy duty, smoked acrylic case. Holds and protects up to 75 5¼" discs with six moveable, indexed dividers.



SUPER BARGAIN — ONLY $9.95

SPECIAL—Purchase this storage case including 10 discs for only $21.95

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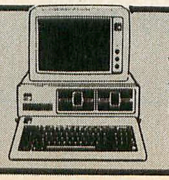
Only $29.95

CoCo-Util is a valuable utility program that allows you to transfer Tandy Color Computer disc files to your MS-DOS machine. You may also transfer MS-DOS files to a Color Computer disc. CoCo-Util will save you countless hours of retyping . . . a great new utility.



PC-XT II

We now offer IBM PC-XT compatible computer systems. Don't settle for a Tandy 1000 or other standard PC until you check our systems and prices.

Starting at $865.

SERIOUS STUFF

ACCOUNTING SYSTEM

The Mark Data Products Accounting System is ideal for the small businessman needing a fast, efficient means to process income and expenses, prepare detailed reports and maintain most of the information required at tax time. The system is a family of programs which operate by means of a "menu" selection scheme. When the operator selects a task to perform, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary accounting reports including a transaction journal, a P & L or income report, an interim or trial balance and a balance sheet.

This accounting software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

ORDER ENTRY SYSTEM

The Mark Data Product sales order processing system provides a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. The system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

This order entry software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

EASY EDIT

Easy-Edit is a versatile, easy to use text editor which is particularly convenient for assembly language and BASIC programming. This editor offers powerful text handling capabilities along with many special features including a built-in disc operating system, 32/64K memory sense, a 51 character by 24 line screen, auto key repeat, extensive error reporting, and complete compatibility with popular assemblers. Requires 32K and at least one disc drive. Master disc and instructions are packaged in an attractive 3-ring binder. **$34.95**

EASY-FILE Data Management System

Rainbow, Nov. '84 *"Easy File is one program that lives up to its name. . . Easy File is so easy it speaks for itself."*

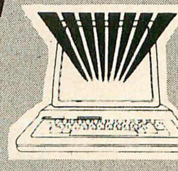
Hot CoCo, Feb. '85 *"I've examined four database programs for the CoCo in the last few months. Easy File is the easiest to master and the one that best addresses my needs. If you need to organize the information in your life, Easy File might just be the best method."*

Need a good mailing list or customer list program? How about a program to keep track of your investments, your computer magazines, or record collection? Do you have an inventory of all household items for insurance purposes? **EASY-FILE** will do all of these things and many more. The **EASY-FILE** master disc and instructions are packaged in an attractive 3-ring binder. Requires 32K and at least one disc drive.

Order Yours Now! Get Organized for Only $59.95!

SUPER SCREEN

The Color Computer Supercharger



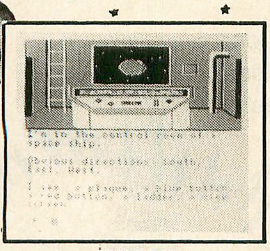
- A big 52 character by 24 line screen
- 'PRINT @' is fully implemented on the big screen
- Easily combine text with hi-res graphics
- Auto-key repeat for greater keyboard convenience
- The 'ON ERROR GOTO' statement is fully implemented
- Control codes for additional function

Guaranteed to be the most frequently used program in your software library. . . once you use it you won't be without it! **Cassette $29.95 Disc $32.95**

JUST FOR FUN

Adventures Now Available for IBM & Tandy 1000/1200

Adventure and Arcade Games • Cassette $24.95 Disc $27.95 • All require 32K



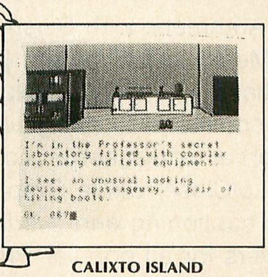
```
I'm in the control room of a
space ship.

Obvious directions: South,
East, West.

I see: a plaque, a blue button,
a red button, a ladder, a view
screen.
```

TREKBOER

This exciting hi-res **adventure** begins aboard the starship Trekboer in the 21st century. Life on Earth is threatened by a deadly virus and your mission is to search the frontiers of space and return with a cure to save mankind from disaster



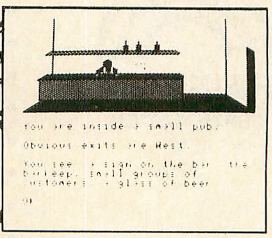
```
I'm in the Professor's secret
laboratory filled with complex
machinery and test equipment.

I see: an unusual looking
device, a passageway, a pair of
hiking boots.

OK, 667
```

CALIXTO ISLAND

A valuable museum treasure has been stolen; can you recover it??? This is a challenging **adventure** with an occasional twist of humor. You'll visit a secret laboratory, a Mayan pyramid, and you'll meet crazy Trader Jack—all in living color and exciting detail.



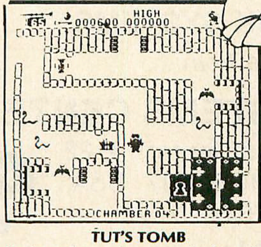
```
You are inside a small pub.

Obvious exits are West.

You see: a sign on the bar, the
barkeep, small group of
customers, a glass of beer
```

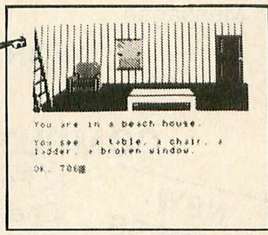
SHENANIGANS

Countless legends tell of a magnificent pot of gold hidden at the end of the rainbow. Many have attempted to find the marvelous treasure but success has eluded them and it remains hidden to this day. You, as a dedicated **adventurer**, have determined to search for the fabled riches.



TUT'S TOMB

Explore the ancient, mystical tomb of the great Pharoah. Find the magical keys which lead you to unbelievable treasures as you outmaneuver the creatures that slither and swarm about you. Super fast **arcade** action—this one will knock your socks off.



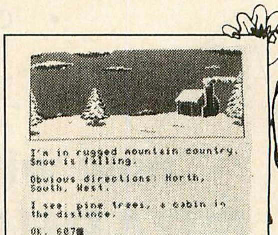
```
You are in a beach house.

You see: a table, a chair, a
ladder, a broken window.

OK, 786
```

SEA SEARCH

Get your shark repellant and scuba tanks ready! The graphics in this **adventure** are truly outstanding and the underwater scenes are unforgettable. You'll run into a pirate, a mermaid and some hungry sharks in this coloful and unique treasure hunt.



```
I'm in rugged mountain country.
Snow is falling.

Obvious directions: North,
South, West.

I see: pine trees, a cabin in
the distance.

OK, 667
```

BLACK SANCTUM

Encounter the forces of black magic as you roam around an 18th century monastery. You'll see all the evil locations in this spooky **adventure**; you'll love searching for and destroying evil in this classic tale. A MUST for every adventure game fan!

SHIPPING: All orders under $100 please add $2 regular, $5 air. All orders over $100 please add 3% regular, 8% air. California residents please add 6% sales tax. Orders outside the continental U.S., check with us for shipping amount; please remit U.S. funds. Software authors—contact us for exciting program marketing details. We accept MasterCard and VISA. Distributed in Canada by Kelly Software.

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Scott Norman, HOT CoCo, October, 1984.

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Built-in Features:

- 51 x 24 Display with Lower Case
- Super-fast Smart Screen Refresh
- Auto-Repeat Keyboard Driver
- Keysaver (TM) repeats last command x times
- Disk Operating System (works just like ROM DOS)
- Easy communication with BASIC/DOS programs
- Two-way communications with PRO-COLOR-FILE ★Enhanced★
- Outputs to ASCII Word Processors like Telewriter-64
- Fast 16-Digit Arithmetic with Scientific Functions
- Summation, Mean, and Standard Deviation Functions
- Logical Functions with String & Numeric Comparison
- String locate command to navigate large worksheets
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- 33k Available Worksheet Space
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- Can use VisiCalc worksheets & training materials
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```
EADD$(Z),C$(Z),QS$(Z),QR$(Z):NEX
T
530 FORP=1TO130:IFQR$(P)="Y"THEN
SOUND200,2
540 IF P>=100THENPRINTP; ELSEPRI
NT" "P;
550 PRINTTAB(5)"-"D$(P);TAB(14)"
-"C$(P);TAB(24)"-"QS$(P);TAB(29)
"-"QR$(P):FORTD=1TO300:NEXTTD,P
560 RESTORE:GOTO30
600 REM **WAC
610 CLS:FORS=1TO50:READS$(S):NEX
T:FORK=1TO220:READD$(K),C$(K),QS
$(K),QR$(K):NEXT
620 CLS:PRINT@2,"WORKED ALL CONT
INENTS RECORD":PRINT:PRINT"CONT-
--DATE---STATION---QSL/S-/R":FOR
Z=1TO6:READCN$(Z),D$(Z),C$(Z),QS
$(Z),QR$(Z):NEXTZ
630 FORP=1TO6:IFQR$(P)="Y"THENSO
UND200,2
640 PRINTCN$(P);TAB(5)"-"D$(P);T
AB(14)"-"C$(P);TAB(24)"-"QS$(P);
TAB(29)"-"QR$(P):FORTD=1TO100:NE
XTTD,P
650 PRINT@G,G$;:GOSUB20
660 RESTORE:GOTO30
700 REM **EXIT
710 CLS:PRINT@174,"END":FORTD=1T
O999:NEXT:CLS:END
720 END
730 REM WAS DATA
740 DATA AL,AK,AZ,AR,CA,CO,CT,DE
,FL,GA,HW,ID,IL,IN,IO,KS,KY,LA,M
E,MD,MA,MI,MN,MS,MO,MT,NE,NV,NH,
NJ,NM,NY,NC,ND,OH,OK,OR,PA,RI,SC
,SD,TN,TX,UT,VT,VA,WA,WV,WI,WY
750 DATA 5/23/71,K4AEB,Y,Y,6/4/7
1,KL7AIZ,Y,Y,4/3/71,W7IEB,Y,Y,5/
22/71,WA5YMW,Y,Y,4/6/71,WB6SLU,Y
,Y,5/12/71,K0SPR,Y,Y,5/12/71,WA1
GNX,Y,Y,5/22/71,WA3HGV,Y,Y,3/17/
71,K4BNC,Y,Y,6/4/71,WB4FYZ,Y,Y
760 DATA 6/20/71,KH6FLC,Y,Y,5/15
/71,W7CNL,Y,Y,5/23/71,WB9CGH,Y,Y
,5/22/71,WA9VGY,Y,Y,3/24/71,W0UT
D,Y,Y,5/22/71,WOJUV,Y,Y,5/12/71,
WA4CXJ,Y,Y,3/27/71,WB5BEZ,Y,Y,3/
17/71,K1FLY,Y,Y,5/22/71,WA3GTX,Y
,Y
770 DATA 3/14/71,W1DQK,Y,Y,3/23/
71,WA8NDL,Y,Y,5/11/71,K0UBP,Y,Y,
6/25/71,K5MDX,Y,Y,5/16/71,W0SJE,
Y,Y,3/14/71,K7YIN,Y,Y,6/18/71,WA
0LRQ,Y,Y,5/6/71,W7GUO,Y,Y,5/26/7
1,K1DQM,Y,Y,3/13/71,W2COT,Y,Y
780 DATA 8/4/71,WA5YJX,Y,Y,5/10/
71,K2AMN,Y,Y,3/27/71,WA4AEB,Y,Y,
3/21/71,W0KZZ,Y,Y,3/20/71,W8KVF,
Y,Y,3/27/71,K5LIL,Y,Y,3/28/71,W7
DH,Y,Y,5/22/71,WA3HUP,Y,Y,5/21/7
1,W1CAB,Y,Y,5/22/71,W4CSP,Y,Y
790 DATA 5/19/71,WA0HMP,Y,Y,5/22
/71,WB4KYA,Y,Y,3/24/71,W5LZZ,Y,Y
,6/22/71,WA7GWU,Y,Y,4/3/71,K1IJJ
,Y,Y,5/22/71,K4AUL,Y,Y,3/25/71,W
7JWE,Y,Y,5/31/71,W8VIF,Y,Y,5/22/
71,WA9UNN,Y,Y,6/9/71,K7AHO,Y,Y
800 REM WAZ DATA
810 DATA -,,,,-,,,,-,,,,3/22/83,
K6RIT,Y,Y,-,,,,-,,,,-,,,,-,,,,-,
,,,-,,,
820 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
830 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
840 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
850 REM DXCC DATA
860 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
870 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
880 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
890 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
900 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
910 DATA -,,,,-,,,,-,,,,-,,,,-,,
,,-,,,,-,,,,-,,,,-,,,,-,,,
920 DATA -,,,,-,,,,-,,,,-,,,,-,,
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RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

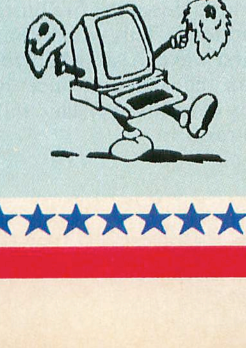
★ Current Record Holder ● Shutout

ANDRONE *(Radio Shack)*
54,300 ★Daphnie Phillips, Evansville, WI
ASTRO BLAST *(Mark Data)*
53,950 ★Bill Fritsch, Whitehall, PA
ATOM *(Radio Shack)*
54 ★Brent Heaton, Anderson, SC
53 Alan Drazen, Longwood, FL
BASEBALL *(Radio Shack)*
525-50 ★Bob Dewitt, Blue Island, IL
89-0 ●Skipper Taday, East Lyme, CT
BATS AND BUGS (THE RAINBOW, 7/84)
24,600 ★Michael Rosenberg, Prestonburg, KY
3,000 Michael Scott, Johnstown, NY
2,500 Steven Bullard, Allen, OK
BEAM RIDER *(Spectral Associates)*
1,198,406 ★James Oakley, Nashville, TN
BLACKBEARD'S ISLAND *(NOVASOFT)*
79 ★Jeff Roberg, Winfield, KS
BLACKJAK (THE RAINBOW, 4/84)
$10,000 ★Wayne Dewitt, Blue Island, IL
BLACK SANCTUM *(Mark Data)*
109 ★James Stakelin, Cynthiana, KY
BLOC HEAD *(Computerware)*
186,700 ★Pierre-Jean Douillard, Granby, Quebec
29,675 Jeff Ray, N. Charleston, SC
BREWMASTER *(NOVASOFT)*
279,600 ★Alan Drazen, Longwood, FL
216,350 Jean-Francois Morin, Loretteville, Quebec
166,175 Scott Purrone, Roselle Park, NJ
98,875 Chris Cope, Central, SC
78,100 Steve Leonard, Roselle Park, NJ
54,325 Jeff Ray, N. Charleston, SC
BROTAN THE BLUE (THE RAINBOW, 8/85)
1,384 ★Michael Scott, Johnstown, NY
822 Brian Voges, Jasper, IN
BUSTOUT *(Radio Shack)*
18,403 ★Chris Zepka, North Adams, MA
BUZZARD BAIT *(Tom Mix)*
4,455,150 ★Paul Rumrill, Gales Ferry, CT
3,091,700 Blossom Mayor, East Greenbush, NY
101,450 Jay Pribble, Davenport, IA
75,700 Paul Bullman, Rocky Mountain House, Alberta
55,450 Terry Pribble, Davenport, IA
CALIXTO ISLAND *(Mark Data)*
115 ★Glenn Della-Monica, Sacramento, CA
CANYON CLIMBER *(Radio Shack)*
9,129,100 ★Gary Mohnsen, Tucson, AZ
362,400 Chris Reynolds, Richmond, KY
286,800 Beverly Herbers, Placentia, CA
184,200 John Guptill, Columbia, MO
162,500 Michael Sileo Jr., Glendale, NY
155,450 Kevin Gallagher, Santa Monica, CA
110,900 Andreas Thaler, Coaticook, Quebec
49,900 Paul Dawson, Carlsbad, NM
CASHMAN *(MichTron)*
$31,260 ★Fred Naumann, Hailey, ID
27,530 Sally Naumann, Hailey, ID
17,850 Matt Mendez, Baltimore, MD
CAVERN COPTER (THE RAINBOW, 2/84)
2,431 ★Jay Beam, Louisville, KY
CHAMBERS *(Tom Mix)*
104,200 ★Blossom Mayor, East Greenbush, NY
CHUCKIE EGG *(A&F)*
418,250 ★Paul Hotz, Herzlia, Israel
CLOWNS & BALLOONS *(Radio Shack)*
352,020 ★Faye Keefer, Augusta, GA
45,460 Joyce Walcott, Mt. Clemens, MI
31,770 Cameron Walcott, Mt. Clemens, MI
30,190 Jason Smith, Ellijay, GA
30,070 Paul Walcott, Mt. Clemens, MI
COLOR BASEBALL *(Radio Shack)*
707-0 ★●Chislain Chillis, Trois-Rivieres, Quebec
549-0 ●Skipper Taday, East Lyme, CT
243-0 ●Steve Mutton, Shrewsbury, MA
147-1 Alton Updike, Deltona, FL
105-0 ●Francis Yu, Calgary, Alberta
COLOR CAR *(NOVASOFT)*
525,650 ★Dan Bouges, Niantic, CT
COLORPEDE *(Intracolor)*
3,107,194 ★John Ray, Goodlettsville, TN
COLOR POKER (THE RAINBOW, 4/83)
169,300 ★Earl La Jesse Foster, Lynchburg, VA
COSMIC INVADERS *(Spectral Associates)*
16,400 ★Mariano Frausto, Blue Island, IL
CRASH *(Tom Mix)*
25,100 ★Jean-Francois Morin, Loretteville, Quebec
CRYSTLE CASTLES *(ThunderVision)*
850,156 ★Michael Brennan, Calgary, Alberta
800,060 Dan Mitenko, Calgary, Alberta
559,380 Jeff Dinger, Edgewood, MD
545,000 Jay Roberg, Winfield, KS
532,000 Eric Roberg, Winfield, KS
CU*BER *(Tom Mix)*
19,550 ★Rodney Mullineaux, Gig Harbor, WA
DALLAS QUEST *(Radio Shack)*
93 ★Tommy McClure, Doyline, LA
93 ★Robert Sunderland, Sacramento, CA
DEFENSE *(Spectral Associates)*
56,720 ★Brett DuPont, Oregon, OH
DEMOLITION DERBY *(Radio Shack)*
88,800 ★Skipper Taday, East Lyme, CT
43,500 Hillel Morris, Chicago, IL
43,100 Chris Fox, Midlothian, VA
37,000 Alexander Taday, East Lyme, CT
DEMON ATTACK *(Imagic)*
16,265 ★Erik Huffman, Rochester Hills, MI
10,830 Rupert Young, Sheffield, MA
DEMON II (THE RAINBOW, 3/85)
21,925 ★Keith Schuler, Merritt Island, FL
DEVIL ASSAULT *(Tom Mix)*
199,300 ★Pierre-Antoine Levesque, Sainte-Foy, Quebec
DOODLEBUG *(Computerware)*
825,370 ★Susan Ballinger, Uxbridge, Ontario
805,010 Bill Fritsch, Whitehall, PA
585,070 Johnny Fritsch, Whitehall, PA
374,390 Blossom Mayor, East Greenbush, NY
DOUBLE BACK *(Radio Shack)*
1,618,400 ★Diane Guernon, Montreal, Quebec
614,450 Eugene Roosa, Stone Ridge, NY
450,600 Michael Brennan, Calgary, Alberta
DOWNLAND *(Radio Shack)*
20,900,400 ★Adam Petersen, Portland, OR
84,454 Tommy McClure, Doyline, LA
68,345 Alain Cyr, Valcourt, Quebec
67,456 Chris Mitchell, Byron, GA
67,141 Cliff Farmer, McGregor, TX
27,676 Paul Dawson, Carlsbad, NM
DRACONIAN *(Tom Mix)*
628,470 ★Jeff Coladonato, Roslyn, PA
DRAGON FIRE *(Radio Shack)*
5,827 ★Susan Coker, Austell, GA
2,885 Stevie Hice, Newton, NC
1,520 Bette Hatcher, Norwalk, CA
DUNKEY-MUNKEY *(Intellectronics)*
66,900 ★Michael Drouin, Reeds Spring, MO
16,500 Baiju Shah, Deep River, Ontario
ELEC*TRON *(Tom Mix)*
40,650 ★Brad Gaucher, Hinton, Alberta
FALCON'S LAIR (THE RAINBOW, 8/85)
17,463 ★Michael Scott, Johnstown, NY
12,497 Dick Teeter, Hawley, PA
8,430 Brian Voges, Jasper, IN
7,792 Steve Artmeier, Jasper, IN
6,960 David Brave, Bloomfield, CT
2,799 Robert Nicosia, Gloversville, NY
FANGMAN *(Tom Mix)*
155,225 ★Daniel Thompson, St. Louis, MO
FOODWAR *(Arcade Animation)*
165,960 ★Chris Cope, Central, SC
FOOTBALL *(Radio Shack)*
266-0 ★●Tim Hart, Salt Lake City, UT
THE FROG *(Tom Mix)*
11,080 ★Mark Ferris, Deep River, Ontario
FROGGER *(Cornsoft)*
15,860 ★Erik Huffman, Rochester, MI
FURY *(MichTron)*
172,300 ★Daniel D'Amour, Pincourt, Quebec
GALACTIC ATTACK *(Radio Shack)*
30,870 ★Oren Bergman, Herzlia, Israel
GALAGON *(Spectral Associates)*
1,306,640 ★Jackie Maddox, Iron Station, NC
GHANA BWANA *(Radio Shack)*
218,420 ★Rupert Young, Sheffield, MA
81,670 Larry Wick, Botkins, OH
81,090 Hollis Holcomb, Blanchard, OK
14,500 Erik Huffman, Rochester Hills, MI
GHOST GOBBLER *(Spectral Associates)*
76,900 ★Ghislain Chillis, Trois-Rivieres, Quebec
75,130 Greg Erickson, Lowell, MA
72,960 Sylvain Castonguay, Chicoutimi, Quebec
55,120 Jeff Weeks, Wetaskawin, Alberta
47,630 Alan Drazen, Longwood, FL
GLAXXONS *(Mark Data)*
19,146 ★Terry Moore, St. Catherines, Ontario
GOLD RUNNER *(NOVASOFT)*
373,850 ★Carmen Izzi Jr., Waterbury, CT
274,300 Andrew Reeves, Woodinville, WA
243,500 Chris Cope, Central, SC
222,450 James Bower, Tuckerton, NJ
163,400 Jeff Roberg, Winfield, KS
100,250 Skipper Taday, East Lyme, CT
GUARDIAN *(Quasar Animations)*
4,350 ★Jason Forbes, Mexico, NY
ICEMASTER *(Arcade Animation)*
85,225 ★Pierre-Antoine Levesque, Sainte-Foy, Quebec
THE INTERPLANETARY FRUIT FLY (THE RAINBOW, 1/85)
37,000 ★Scott Perkins, Port Orange, FL
22,000 Steven Bullard, Allen, OK
16,500 Michael Scott, Johnstown, NY
THE JUNGLE (THE RAINBOW, 8/84)
668,690,000 ★Jeff Lawrence, Cambridge, Ontario
JUNIOR'S REVENGE *(Computerware)*
1,072,600 ★Matthew Ramsay, Detroit, MI
JUNKFOOD (THE RAINBOW, 11/84)
1,187,520 ★Larry Thomson, Menominee, MI
KATERPILLAR II *(Tom Mix)*
156,317 ★Uwe Steingens, Essen, West Germany
KEY BOMBER (THE RAINBOW, 8/84)
29,052 ★Tony Boring, Armagh, PA
KEYS OF THE WIZARD *(Spectral Associates)*
662 ★John Fulton, Boydton, VA
662 ★Ken Ostrer, Vancouver, WA
THE KING *(Tom Mix)*
1,670,900 ★Yolanda Farr, Sayre, PA
KING TUT *(Tom Mix)*
138,500 ★Martin Culver, San Francisco, CA
KLENDATHU *(Radio Shack)*
1,177,550 ★Dan Franzen, Westlake, OH
412,809 Jay Pribble, Davenport, IA
266,362 Brian Ennis, Wilmington, NC
KRON *(Oregon Color Computers)*
33,000 ★Chris Cope, Central, SC
LANCER *(Spectral Associates)*
663,000 ★Jay Roberg, Winfield, KS
LASERWORM & FIREFLY (THE RAINBOW, 11/83)
38,380 ★Brian Voges, Jasper, IN
LEMANS *(Spectral Associates)*
0:70 ★Jeff Dinger, Edgewood, MD

SCOREBOARD

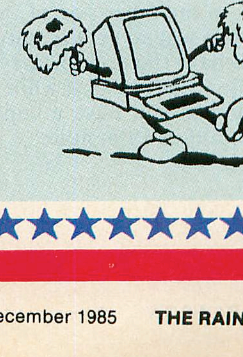
LUNAR-ROVER PATROL *(Spectral Associates)*
136,700 ★Lori Day, Arlington, TX
MADNESS & THE MINOTAUR *(Radio Shack)*
240 ★Chris Mitchell, Byron, GA
MARATHON (THE RAINBOW, 10/83)
307,790 ★James Sheedy III, Tonawanda, NY
MAROONED! *(Saguaro)*
58 ★Mikel Rice, Panama Citv. FL
THE MARTIAN CRYPT *(NOVASOFT)*
31 ★John Allocca, Yonkers, NY
MAZELAND *(Chromasette)*
21,060 ★Todd Knapp, Prairie du Chien, WI
MEGA-BUG *(Radio Shack)*
10,661 ★Blain Jamieson, Kingston, Ontario
10,223 James Mancari, Ravenswood, WV
8,054 Jeremy Johnson, Nokomis, FL
7,930 Ron Haines, Nepean, Ontario
7,801 Jen Teeter, Hawley, PA
4,089 Dawn Best, Grant, NE
MICROBES *(Radio Shack)*
491,100 ★David & Alan Heckler, Hartselle, AL
MISSILE BARRAGE (THE RAINBOW, 8/83)
2-1 ★Joe Calcaterra, Ridgewood, NY
MONKEY KONG *(Med Systems)*
365 ★Mark Ferris, Deep River, Ontario
MONSTER MAZE *(Radio Shack)*
206,780 ★Wanda Jones, Brantford, Ontario
93,890 Rupert Young, Sheffield, MA
10,740 Scott Swedis, Spencer, MA
MOON HOPPER *(Computerware)*
79,830 ★Daniel D'Amour, Pincourt, Quebec
MOON SHUTTLE *(Datasoft)*
38,600 ★Jeff Weeks, Wetaskawin, Alberta
MR. DIG *(Computerware)*
6,787,000 ★Jeff Roberg, Winfield, KS
MUDPIES *(MichTron)*
981,700 ★Jon Blow, San Diego, CA
NINJA WARRIOR *(Programmer's Guild)*
28,800 ★Dave Iverson, Oakville, Ontario
OPERATION FREEDOM (THE RAINBOW, 8/85)
10,926 ★David Brave, Bloomfield, CT
OUTHOUSE *(MichTron)*
172,270 ★Matt Johnson, Eagle, PA
PAC 'EM (THE RAINBOW, 1/84)
575 ★Greg Lewis, North Augusta, SC
PAC-TAC *(Computerware)*
120,050 ★Matt Johnson, Eagle, PA
PENGUIN (THE RAINBOW, 2/85)
48,250 ★Paul Wagorn, Carp, Ontario
44,550 Kevin Gallagher, Santa Monica, CA
20,780 George Bodiroga, Eureka, CA
1,660 Robert Nicosia, Gloversville, NY
PHANTOM SLAYER *(Med Systems)*
1,326 ★Susan Ballinger, Uxbridge, Ontario
PINBALL *(Radio Shack)*
4,370,000 ★Christopher Ward, Burlington, IA
PIPELINE (THE RAINBOW, 6/83)
2,829 ★Mike Garozzo, Morrisville, PA
PLANET INVASION *(Spectral Associates)*
155,000 ★Jimmy Doyle, Barrackville, WV
67,700 Alan Drazen, Longwood, FL
58,650 Ghislain Chillis, Trois-Rivieres, Quebec
39,350 Paul Hotz, Herzlia, Israel
17,800 Laura Hotz, Herzlia, Israel
POLARIS *(Radio Shack)*
189,867 ★Andre Savoie, Marieville, Quebec
POLTERGEIST *(Radio Shack)*
6,000 ★Billy Fairfull, Charleston, SC
POOYAN *(Datasoft)*
3,785,000 ★Ben Collins, Clemson, SC
POPCORN *(Radio Shack)*
45,210 ★Mike Norris, Columbia, SC
PROJECT NEBULA *(Radio Shack)*
2,750 ★Jeff Murphy, Lake City, GA
PYRAMID *(Radio Shack)*
220/112 ★Byll Adams, Pasadena, TX
220/112 ★George Fairfield, Victoria, British Columbia
220/112 ★David Oelhaupl, Calgary, Alberta
220/112 ★Robbie Sablotny, Mt. Zion, IL
Q-NERD (THE RAINBOW, 5/84)
1,958,950 ★Bruce Baltzer, Hanover, Ontario
QUIX *(Tom Mix)*
907,320 ★Andrew Norrie, Mississauga, Ontario

RAAKA-TU *(Radio Shack)*
50 ★Ryan Devlin, Louisville, KY
50 ★Aaron Flaugher, Hamilton, OH
50 ★John Fulton, Boydton, VA
50 ★Todd Knapp, Prairie du Chien, WI
50 ★Ken Ostrer, Vancouver, WA
50 ★Robbie Sablotny, Mt. Zion, IL
RACER (THE RAINBOW, 3/85)
174.9 ★Kirby Smith, York, PA
12.9 Robert Nicosia, Gloversville, NY
12.4 Michael Scott, Johnstown, NY
RADIO BALL *(Radio Shack)*
4,510,740 ★Les Dorn, Eau Claire, WI
REACTOIDS *(Radio Shack)*
5,257,295 ★Gary Bedford, Piqua, OH
RETURN OF THE JET-I *(ThunderVision)*
538,432 ★Matt Griffiths, Stilwell, KS
REVERSE (THE RAINBOW, 7/84)
7 ★Jon Hobson, Plainfield, WI
ROAD RACE (THE RAINBOW, 11/84)
91.7 ★Bill Martin, Myrtle Beach, SC
ROBOTRON *(Intracolor)*
335,400 ★Baiju Shah & Mark Ferris, Deep River, Ontario
ROBOTTACK *(Intracolor)*
463,650 ★Jay Pribble, Davenport, IA
299,350 Chris Zepka, North Adams, MA
36,090 Hiram Esparza, Blue Island, IL
RUN FOR YOUR LIFE (THE RAINBOW, 4/85)
50,000 ★Karen Goddard, Oshawa, Ontario
20,000 Ryan Devlin, Louisville, KY
20,000 Brian Voges, Jasper, IN
SAILOR MAN *(Tom Mix)*
879,100 ★Alan Drazen, Longwood, FL
SANDS OF EGYPT *(Radio Shack)*
77 ★Jeff Hillison, Blacksburg, VA
80 John Allocca, Yonkers, NY
80 Bob Dewitt, Blue Island, IL
82 Jeff McKay, Travis AFB, CA
84 Greg Ross, Martinsville, NJ
86 Phill Zarfos, Dallastown, PA
SCARFMAN *(Cornsoft)*
545,700 ★Matthew Ramsay, Detroit, MI
SEA DRAGON *(Adventure International)*
76,110 ★Jean-Francois Morin, Loretteville, Quebec
SEASTALKER *(Infocom)*
100/223 ★Erik Huffman, Rochester Hills, MI
SHAMUS *(Radio Shack)*
62,940 ★Jon Blow, San Diego, CA
SHENANIGANS *(Mark Data)*
95 ★Jeff Hillison, Blacksburg, VA
95 ★David Kay, Winnipeg, Manitoba
SHOOTING GALLERY *(Radio Shack)*
227,840 ★Cliff Farmer, McGregor, TX
SKIING *(Radio Shack)*
1:00 ★Scott Clevenger, Fairmount, IN
1:00 ★Billy Fairfull, Charleston, SC
1:10 Kevin Gallagher, Santa Monica, CA
1:17 Michael Drouin, Reeds Spring, MO
SKRAMBLE *(Tom Mix)*
80,020 ★Brad Houlden, Kenora, Ontario
SLAY THE NERIUS *(Radio Shack)*
472,667 ★Jim Herbers, Placentia, CA
SNAKER (THE RAINBOW, 1/84)
1:23 ★Dan Sobczak, Mesa, AZ
1:24 Luanne Ashby, Phoenix, AZ
SOLO POKER *(Datasoft)*
1,100 ★Carol Staker, Moscow, ID
SPACE AMBUSH *(Computerware)*
29,480 ★Frank Canepa III, Santurce, Puerto Rico



SPACE ASSAULT *(Radio Shack)*
163,970 ★Jim Tucker, Commerce, TX
24,430 Michael Drouin, Reeds Spring, MO
19,065 Steven Allen, Sharpsburg, MD
SPACE RACE *(Spectral Associates)*
83,422 ★Mark Donahue, Alexandria, VA
SPACE WREK *(Spectral Associates)*
58,300 ★Brad Gaucher, Hinton, Alberta
SPEED RACER *(MichTron)*
139,210 ★Alan Drazen, Longwood, FL
129,950 Jeff Dinger, Edgewood, MD
128,590 Paul Hotz, Herzlia, Israel
126,750 Jack Manzullo, Saginaw, MI
107,290 Oren Bergman, Herzlia, Israel
STAR BLAZE *(Radio Shack)*
8,400 ★John Guptill, Columbia, MO
7,050 Andreas Thaler, Coaticook, Quebec
STARSHIP CHAMELEON *(Computerware)*
68,800 ★Brian Voges, Jasper, IN
STELLAR LIFE-LINE *(Radio Shack)*
119,030 ★Brian Shaber, Boise, ID
STORM ARROWS *(Spectral Associates)*
263,850 ★Arnold Snitser, Los Angeles, CA
STRANDED *(Computer Island)*
70 ★Mikel Rice, Panama City, FL
TEMPLE OF ROM *(Radio Shack)*
959,400 ★Sonya Hurst, Richmond, CA
TIME BANDIT *(MichTron)*
1,025,210 ★Terry Moore, St. Catherines, Ontario
747,460 Steven Coladonato, Roslyn, PA
359,980 Kristopher Staller, Ft. Wayne, IN
215,810 Mark Olson, Whitecourt, Alberta
106,390 Sylvain Castonguay, Chicoutimi, Quebec
THE TOUCHSTONE *(Tom Mix)*
226,640 ★Kristopher Staller, Ft. Wayne, IN
TRAILIN' TAIL (THE RAINBOW, 8/83)
273,390 ★Jerry Dill, Grafton, MA
TRAPFALL *(Tom Mix)*
80,116 ★Kenneth Merkel, Houston, TX
TUBE FRENZY *(Aardvark)*
140,280 ★Becky Baker, Marissa, IL
TUTANKAM *(Aardvark)*
321,660 ★Pierre-Antoine Levesque, Sainte-Foy, Quebec
TUT'S TOMB *(Mark Data)*
189,960 ★Nicole Pouliot Coors, Mobile, AL
WHIRLEYBIRD RUN *(Spectral Associates)*
117,000 ★Jeff Ray, N. Charleston, SC
105,400 Sylvain Castonguay, Chicoutimi, Quebec
54,500 Jay Aust, Marlborough, CT
43,850 Glen Bilodeau, Otterburn Park, Ontario
43,350 PJ Jayakody, Shelbyville, TN
25,400 Andreas Thaler, Coaticook, Quebec
WILDCATTING *(Radio Shack)*
$30,193,000 ★Gary Mohnsen, Tucson, AZ
WILLY'S WAREHOUSE *(Intracolor)*
296,700 ★Chris Reynolds, Richmond, KY
183,500 Alan Morris, Chicopee, MA
ZAXXON *(Datasoft)*
2,068,900 ★Dave Levora, Oak Forest, IL
2,057,800 Chris Oberholtzer, Lexington, MA
1,700,000 Biagio Di Lorenzo, Montreal, Quebec
1,510,000 James Quadrella, Brooklyn, NY
870,000 Michael Daniels, Jackson, TN
113,200 Ken Bullis, Yellowknife, Northwest Territories
41,800 John Anderson, Midlothian, VA

— Debbie Hartley



SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

Scoreboard:

I would like to respond to Charles Farris' letter (October 1985) concerning *Calixto Island*. I have solved the game, and as far as I know there is nothing in the pottery. Also, the specs are used to read the microfilm.

I have some other hints for *Calixto Island* that may be helpful to those of you who have been frustrated time and time again. To get across the water you need the ancient canoe paddles. To find them, bring the machete, the flashlight and the mice to the pyramid. Finding the paddles is up to you. One last hint: When going across the water, bring the bucket with you. It may prevent you from getting into the game *over your head*.

Edward Heinemann
Newton Centre, MA

Scoreboard:

In response to Chris Allbritton's letter (October 1985) concerning *Raaka-Tu*, when you leave the room with the statue in it, it states that you are at the south end of the Great Central Hallway. You simply go north to the north end of the Great Central Hallway and then travel west once. There you'll find the candle.

Mike Gaither
Clarence, NY

TIME FOR REBUTTLE

Scoreboard:

First to Ian Loeppky, I would like to point out one important fact about the game *Pyramid*: If you try to get the statue of the bird while holding the scepter, it will come alive and fly to the other side of the room. In fact, the only way to get the statue of the bird is if you have the box to carry it in. It is not possible to get the bird while holding the scepter unless you have a copy of the program that differs from mine.

Now, for Todd Harris. My letter [March 1985] said, "For *Pyramid* don't worry about the scepter, you'll find you don't need it, so why waste valuable moves getting it." At no point did I say it is useless. Sure, you can wave the scepter over one of the pits and a bridge will fall; however, if you go that way, and if you get the scepter, you are wasting at least six moves and the object of an Adventure game is to gather all the objects needed to complete the Adventure in the shortest moves possible.

David Oelhaupl
Calgary, Alberta

SNEAKING UP FROM BEHIND

Scoreboard:

For everyone who is having trouble with *Rommel 3-D* by MichTron, I have a hint you may find useful. Get the enemy tank behind you so that he is chasing you. Then, drive your tank off of the screen and you will come up behind him on the opposite side of the screen. While you are behind him and the enemy tank is turning around to face you, you can blast him.

Steve Smith
Ashdown, AR

OUTSMARTING THE ALIENS

Scoreboard:

I have a few hints for *Galagon*. The surest way to get two fighters on the screen is to get one fighter captured, shoot all remaining aliens except the one with the captured fighter, and then kill the alien with your fighter. This also works if there are two or less aliens on the screen. At the beginning of each stage, hold down the fire button and move back and forth. This will decimate the aliens in the first wave. Also, when you have two fighters on the screen at once, both of their shots only count as one. This will boost your hit/miss ratio.

I need some help with *Shenanigans*. How do you open the window in the dimly lit hall? What does the billboard say and what does it mean?

Also, does anyone out there live in the Netherlands or Belgium? I would like to find a fellow hacker here.

Please send any information to the "Scoreboard." All help would be appreciated.

Charles Farris
Schinveld, The Netherlands

OOPS . . .

Scoreboard:

To all the people who wrote to me for the solution to *Dungeons of Daggorath*, I made an error. The incantation of the third ring is not Power, but Energy. I hope the mistake didn't cause you any problems.

Mike French
Covington, VA

SO CLOSE

Scoreboard:

I've almost finished *Keys of the Wizard*, but I don't know what to do with the jester or unicorn. I'd appreciate any help.

Jimmy Doyle
Barrackville, WV

LEFT IN THE DARK

Scoreboard:

Does anyone know how to get past the trading post in *Dallas Quest*? I've been able to bribe the monkey to pull aside the rug in order to reveal the trapdoor. The problem is I don't have a flashlight to see anything.

Also, how do you get to the crossroads?

In *Sands of Egypt*, could anyone please tell me how to get the treasure out of the secret chamber?

Jon Olson
Englewood, OH

STRIKING BACK

Scoreboard:

In *To Preserve Quandic*, if you are continuously killed by the guard in the den, try typing `ATTACK GUARD`. You may have to do this a few times to kill him. Sometimes he will kill you, but it is the only way you will be able to get into the safe behind the picture. If you aren't able to program the computer (and if you are in the closet on the second floor), try typing `EXAMINE COAT`. This will give you the password to the computer.

In *Madness and the Minotaur* there are two crypts on the second level. To open a crypt, you must be carrying nothing at all. Type `OPEN CRYPT` and you will find a treasure.

In *Shenanigans*, if you are unable to get past the muggers in the street (and if you have the pocket knife), try typing `OPEN KNIFE`.

I am having trouble in *Syzygy*. I am able to get the light saber, but I am unable to defeat Darth Vader with it. How is it done?

In *Sea Search*, I am unable to find the credit card. Where is it? Any help with these questions would be greatly appreciated.

Ric Miller
Winnipeg, Manitoba

ALLIED ASSAULT

Scoreboard:

After slaughtering the wizard for at least the 40th time, I'll share a foolproof way to quickly clean out the fifth level of *Dungeons of Daggorath* without getting hit or being chased by creatures. I call this way the "Allied Assault" strategy. The secret lies with the fact that the lower level creatures (spider, snake and blob) cannot kill you, even if you occupy the same cell without a shield! From the fourth level, descend through the hole near the northwest corner and turn east. Move to the second intersection and stop. Wait (or scurry about) until a lower level creature occupies the same cell as you. Do *not* kill it — it's your ally.

Creatures will line up along the east-west and north-south corridors from your intersection position. Creatures in adjacent cells cannot attack you. Move (M) forward once. Hit twice with the Elvish sword and move back (MB) once — fast — so your ally does not have a chance to move. Continue slaughtering creatures until you kill the wizard.

If you are good on the keyboard and know the number of hits required to kill a creature, you can "steal" the dropped goody before your ally has a chance to move from the corridor intersection. Note: After the wizard is killed, you'll see the petrified ghosts of any remaining creatures, including your ally.

L. Grant Shideler
Lakewood, CO

KNOW YOUR NUMERALS

Scoreboard:

Here are a few hints for those of you having trouble with *Trekboer*.

Once you dig on the frozen planet, use the blanket to get the ice. Don't worry about the steel canteen — it's useless.

Don't throw away the amulet. It brings good luck on the garden planet, and if you want to find the coordinates of the secret planet, you need to know your Roman numerals.

In *Dungeons of Daggorath*, when you defeat the wizard's image you will go to the fourth level with only a torch and what you have in your hands. Don't try to attack the galdrogs right away. Go for easier things at first. Move around a lot on the fourth level or the monsters will "form a line" after a few minutes, waiting for their turn at you. Don't attack with the Elvish sword many times in a row. This is hazardous to your health.

I need help with *To Preserve Quandic*. How do I use the car or the helicopter? I am nearly sick of *Pyramid*! I can't find six treasures. Any help would be appreciated.

Tommy McClure
Doyline, LA

SAFETY LADDER

Scoreboard:

I know of a glitch in the game *Canyon Climber*. I can get the high scores listed in "Scoreboard" for *Canyon Climber* with the blink of my eyes. What you do is get past the first level (goats) and play the second. Jump the arrows, but don't get the shield. After you climb the first ladder and the second Indian begins shooting, climb down and just start to jump arrows. The arrows shouldn't kill you if you don't move from under the ladder.

Jermaine Jackson
Tallulah, LA

RESISTING TEMPTATION

Scoreboard:

Here are a few interesting bits of information about Tandy's *Dragon Fire* and *Dallas Quest*.

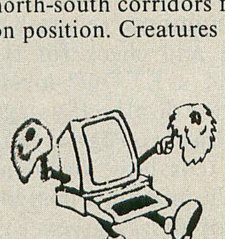
In the Dragon's Treasure Room sequences of *Dragon Fire*, the points the player gathers for treasure are placed in a buffer and added one-by-one to the score. Therefore, on higher level screens, you must spend more time in the room to receive the points you've earned. Fight the natural tendency to grab the treasures and leave; play dodgeball with the dragon until your score stops increasing to get the maximum score for each castle.

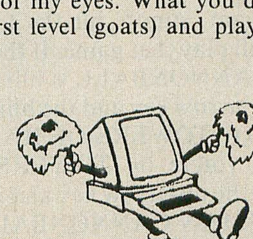
Adventurers who have solved *Dallas Quest* may be interested in the program's demonstration mode. Pressing and holding down the 'T,' 'R' and 'S' keys during the opening credits until the screen turns orange (`SCREEN 0,1`) causes the computer to run a movie trailer-like demonstration of the Adventure. Players who haven't solved it yet are advised not to try this because it gives away some of the climactic graphics and spoils the surprise. I assume that Radio Shack included the attract mode for display in stores, but it's a lot of fun and something to do when you've "finished" the program.

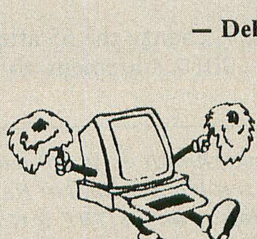
Dale Dobson
Menominee, MI

To respond to other readers' inquiries and requests for assistance, reply to Scoreboard Pointers, c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all Scoreboard readers in an upcoming issue.

— Debbie Hartley







A potpourri of games to challenge your wits

Brain Games

By Kraig Brockschmidt

A collection of five challenging and exciting programs combined into one, *Brain Games* requires 32K ECB for the full program. It can easily be altered to fit into a 16K machine with the deletion of a graphics display in one of the games, which has no effect on the program. The five games are *Towers of Hanoi, Jump 15, Flip-Over, Short-Term Memory Test* and *The Human Cannonball.* The first three are challenges for your insight; the last two are a test for your memory and a fun practice in trial and error.

Type in the program or load it from cassette using `CLOAD` and ENTER. If you need to make the 16K alterations, follow the steps below:

1) In Line 7, change the 65 after the `ON. . .GOTO` statement to read 69.
2) Delete the X(900) after the `DIM` statement in Line 0 (make sure you also delete the comma preceding it).
3) Delete lines 65-68 and Line 73.
4) Remove the `PUT` statement in Line 71.

When you run the program, a title screen with the five individual program names appears. The line that reads TOWERS OF HANOI will be blinking alternately black and green. If you want to play that game, hit the ENTER key. If not, hit either the up- or down-arrow keys and the blinking will move accordingly. When you get to the title of the game you want, simply hit the ENTER key and it will play that game. If the title HUMAN CANNONBALL is blinking, hit the down-arrow key and the blinking will move up to TOWERS OF HANOI. Likewise, if you're on TOWERS OF HANOI, hit the up-arrow key and it will move to HUMAN CANNONBALL.

Each subprogram has completely different instructions and objectives. All five are outlined separately as follows.

Towers of Hanoi: The object is to transfer the stack of different-sized discs from the first peg to the third peg. As you begin, the computer asks you to select the number of discs you wish to play with, from two to six. Keep in mind that the more discs you choose, the longer and harder the game will be. You can place any disc on any peg, provided the disc underneath (if there is one) is not smaller than the one you are attempting to place on top.

To move the discs, the computer asks FROM? TO? and awaits your input. The first number should be the number of the peg from which you want to move the top disc, and the second number is where that disc is to be placed. When entering these numbers, separate them with a comma and check for typing errors to avoid a REDO? message, which will ruin the display. If you get all the discs from Peg #1 to Peg #3, you win. The computer tells how many moves you made and the minimum possible for that number of discs, given by the simple formula (2↑N)-1, where 'N' is the number of discs.

If you get stuck, type in two zeros for your move. The computer asks PLAY

(Kraig Brockschmidt is a 16-year-old senior at Hazen High School in Renton, Wash. He has won in THE RAINBOW *One-Liner contest and runs Sigma Software. He's had his CoCo for five years and plans a career in Astrophysics.)*

AGAIN (Y/N). If your answer is 'N', the program returns to the title page.

Jump 15: The object here is to eliminate all but one of the dots in the pyramid by jumping any other dot. The game starts with drawing the screen display and 14 dots, in the numbered spaces 2-15, and an open spot in Space 1. It then asks you FROM? TO?, to which you'll respond by typing in the number of the dot you wish to jump with, a comma and the number of the space you want it to jump into. Any jumping must be done in a straight line; you can't jump more than one dot or off the board. Once a dot is jumped over by another, it's taken off the board.

If you noticed that there aren't any `DATA` statements containing all the possible jump combinations, it's because of a simple twist of this puzzle. If you take the number of the space you're jumping from and add the number of the space you're jumping to, divide by two and drop all fractions, that is the number of the only possible space you can jump over in that line. While there are several routes to take, the last dot will always be in Space 13.

Flip-Over: This is the hardest of the first three games. To win, you must move the white dots on the left side to occupy the four spaces on the right side, which are occupied with either blue or red dots. You can move any white dot one space to the right or jump *one* dot, but white *always* moves to the right — it cannot move backwards. Likewise, the blue or red dots can only move to the left in the same manner.

Operation is fairly simple. To "pick up" the dot you want to move, hit the right- or left-arrow key until the small line under the bottom of the rectangular border is directly under the dot you want to pick up. Press the ENTER key and it's been picked up. Next, move the small line under the space you want to move it to (this space must be black) and hit the ENTER key again. If it's a legal move, the dot will be moved, otherwise, you'll hear a short, low tone, and you must pick up a dot again and continue playing.

If you get stuck, which is not uncommon, press the 'Q' key and the familiar PLAY AGAIN appears. If you succeed in "flipping-over" the puzzle, you win. An amazing show of exceptional intelligence!

Short-Term Memory Test: This is simply to test your memory, and you can't win or lose. On start-up, you'll be asked to remember two numbers. When you're ready to have them flashed before you, hit the ENTER key. Two numbers will be shown quickly and you'll be asked to type in those numbers in the order they appeared on the screen. Be sure you put a space between each number and no space at the end or the computer will say you're wrong. If correct, you'll be told, then you have to remember one more number. If you're wrong, you still have two more chances to remember the right sequence. This keeps running until you miss the sequence three times in a row. The average amount of numbers memorized by a person is seven.

Human Cannonball: The object is to land the stunt man safely into the net by choosing the correct angle of elevation of the cannon so he'll fly just as far as the net, but not over- or undershoot it. If you're running the 32K version, you'll have to wait while it draws a circus tent and the audience before playing. After you wait once, however, you don't have to wait again, unless you BREAK the program and rerun it. If you have 32K and wish to speed it up, you can make the 16K alterations.

Once the display is drawn, an entire half of the `PMODE 4` screen is stored in Array X. Contrary to the ECB manual, you don't need to `DIM X(256,96)` as the manual says, but you only need one array variable (`(DIM X(1)` would be one array variable) for every 40 pixels being stored. Instead of "`DIM`ming" X(256,96), which is 24576 bytes of memory, you need only `DIM` one-fortieth of that, or 615. In the program I use 900 to be on the safe side, so there's no chance of getting a ?BS Error caused by not having enough array variables.

Once you type in an angle between one and 89 (decimals are allowed), you'll see a graphics display of the results. If you hit the net, you'll hear some peppy musical notes and are asked to PLAY AGAIN? If you missed, you'll be told how much you missed by and asked for another angle. If you missed by a negative number, it means the net was undershot; a positive number means it was overshot. In either case, type in a smaller or larger angle and ENTER it. Muzzle velocity of the cannon is 110 meters per second.

Please realize that the first three games are rather challenging and it may take awhile to solve them. If you decide you can't figure them out, I'll be happy to send you the solutions for $1 and an SASE. I can also send you listings of each and any of the five individual games which are self-running, for 25 cents each and an SASE. Finally, if typing is not your game, send me $4 and I'll mail you a cassette with several copies of the program on it. My address is 14024 152nd Ave. S.E., Renton, WA 98056. ☐

9	47
18	47
28	57
37	5
51	241
62	78
69	137
END	172

The listing: `BRAINGME`

```
0 CLS:CLEAR350:DIMH(3),L(15),P(1
5),N$(15),X(900):K=0:R=RND(-TIME
R):'16K users! Make all required
 changes before running
1 RESTORE:T=1:' BRAIN GAMES
     (C) 1985 BY
     KRAIG BROCKSCHMIDT
     14024 152ND AVE SE
     RENTON, WA   98056
2 CLSRND(8):PRINT@10,"BRAIN GAME
S";:PRINT@35,"<C>1985 KRAIG BROC
KSCHMIDT";
3 PRINT@135," TOWERS OF HANOI ";
:PRINT@203," JUMP 15 ";:PRINT@26
6," FLIP-OVER ";:PRINT@326," SHO
RT-TERM MEMORY ";:PRINT@390," HU
MAN  CANNONBALL ";
4 FORG=1TO5:READC(G),J(G),J$(G):
```

```
NEXT:DATA1,136,"towers of hanoi"
,2,204,"jump 15",3,267,"flip-ove
r",4,327,"short-term memory",5,3
91,"human  cannonball"
5 RESTORE:PRINT@J(T),J$(T);:A$=I
NKEY$:IFA$="^"THENT=T-1:IFT<1 TH
ENT=5:GOTO8
6 IFA$=CHR$(10)THENT=T+1:IFT>5 T
HENT=1:GOTO8
7 IFA$=CHR$(13)THEN ON C(T) GOTO
9,28,39,59,65
8 GOTO3
9 CLS:RESTORE:FORT=1TO15:READA$:
NEXT
10 U=0:INPUT"HOW MANY DISCS (2-6
)";B:IFB<2 OR B>6 THEN10ELSEFORX
=1TO6:FORZ=2TO3:A(Z,X)=0:NEXT:NE
XT
11 NL$=STRING$(5,CHR$(128))+CHR$
(245)+STRING$(5,CHR$(128)):FORC=
1TO6:READT,X:D$(C)=STRING$(X,CHR
$(T)):NEXT:DATA239,1,223,3,207,5
,191,7,175,9,159,11
12 CLS0:FORY=5TO18:SET(11,Y,8):S
ET(33,Y,8):SET(53,Y,8):NEXT:FOR
X=0TO63:SET(X,18,8):NEXT:PRINT@3
26,"1";:PRINT@336,"2";:PRINT@347
,"3";
13 S=1:FORZ=1TO6:IF7-Z>B THENA(1
,Z)=0ELSE A(1,Z)=S:S=S+1
14 BB(Z)=A(1,Z):NEXT:H(1)=7-B:H(
2)=6:H(3)=6
15 FORZ=1TO3:FORX=1TO6:READ Q(Z,
X):NEXT:NEXT:DATA 96,128,160,192
,224,256,107,139,171,203,235,267
,117,149,181,213,245,277
16 FORX=1TO6:FORZ=1TO3:PO=Q(Z,X)
+5-INT(LEN(D$(A(Z,X)))/2):IF A(Z
,X)>0 THENPRINT@PO,D$(A(Z,X));EL
SEPRINT@PO-5,NL$;
17 NEXT:NEXT
18 PRINT@448,STRING$(32,CHR$(128
));:PRINT@416,"FROM ? TO ";:INPU
TQ,W:IF Q>3 OR W>3 OR Q=W OR Q<1
 OR W<1 THEN 23 ELSE IF A(Q,H(Q)
)>A(W,H(W)) AND A(W,H(W))>0 THEN
 23 ELSE IFA(Q,H(Q))=0 THEN 23
19 IFH(W)=6 AND A(W,H(W))=0THEN
A(W,6)=A(Q,H(Q)):A(Q,H(Q))=0:H(Q
)=H(Q)+1:IFH(Q)>6 THENH(Q)=6:GOT
O23ELSE23
20 A(W,H(W)-1)=A(Q,H(Q)):A(Q,H(Q
))=0:H(Q)=H(Q)+1:IFH(Q)>6THENH(Q
)=6
21 H(W)=H(W)-1:IFH(W)<1THENH(W)=
1
22 FORC=1TO6:IFA(3,C)<>BB(C)THEN
23ELSENEXT:U=U+1:GOTO25
23 IFQ<>0 AND W<>0 THENU=U+1ELSE
IFQ=0 AND W=0THEN27
24 PRINT@428,"     ":GOTO16
25 CLS:PRINT"YOU WIN!!!!":PRINT"
IT TOOK YOU";U;"TURNS":PRINT"MIN
UMUM TURNS POSSIBLE:";(2^B)-1:PR
INT:PRINT
26 GOSUB84:GOTO9
27 PRINT@384,"YOU'RE STUCK - YOU
 LOSE!!!":GOTO26
28 XZ$=STRING$(32,CHR$(128)):FOR
 T=1TO45:READ A$:NEXT:Z$=CHR$(19
6)+CHR$(200):X$=CHR$(128)+CHR$(1
28):FOR T=1TO15:L(T)=1:READ P(T)
:IF LEN(STR$(T))=2 THEN N$(T)="0
"+RIGHT$(STR$(T),1) ELSE N$(T)=R
IGHT$(STR$(T),2)
29 NEXT:DATA79,141,145,203,207,2
11,265,269,273,277,327,331,335,3
39,343
30 Q=0:L(1)=0:CLS0:FOR T=1TO15:P
RINT@P(T)+32,N$(T);:NEXT:FOR X=3
2TO55:Y=X-31:SET(X,Y,3):SET(63-X
,Y,3):NEXT:FOR X=9TO55:SET(X,24,
3):NEXT
31 FORT=1TO15:IFL(T)=1THENPRINT@
P(T),Z$;:NEXT ELSE PRINT@P(T),X$
;:NEXT
32 IFQ=1THENRETURNELSEPRINT@416,
"";:INPUT"FROM ? TO ";A,B:IF A>1
5 OR B>15 THENPRINT@429,"
";:PRINT@448,XZ$;:GOTO32
33 IFA=0 AND B=0THEN38ELSEIFL(A)
=0 OR L(B)=1 OR L(INT(A+B)/2)=0T
HENPRINT@429,"       ";:PRINT@44
8,XZ$;:GOTO32
34 IFA=11 AND B=15THENPRINT@429,
"     ";:PRINT@448,XZ$;:GOTO32
35 L=0:L(A)=0:L(INT((A+B)/2))=0:
L(B)=1:FORT=1TO15:IFL(T)=1THENL=
L+1
36 NEXT:PRINT@429,"      ";:PRIN
T@448,XZ$;:IFL>1THEN31ELSEQ=1:GO
SUB31:PRINT@448,"YOU WIN!!!
    "
37 GOSUB84:FORT=2TO15:L(T)=1:NEX
T:GOTO30
38 PRINT@448,"SO YOU'RE STUCK -
YOU LOSE!":GOTO37
39 PMODE4:PCLS:SCREEN1,1:PMODE3:
COLOR3,1:LINE(30,76)-(226,116),P
SET,BF
40 FORX=47TO212STEP20:CIRCLE(X,9
6),8,1,.8:PAINT(X,96),1,1:NEXT
41 FORX=47TO107STEP20:PAINT(X,96
),0,3:NEXT:FOR X=147TO207STEP20:
PAINT(X,96),2,3:NEXT:H=127
42 GOSUB54:GOSUB50
43 X1=H
44 GOSUB50
```

Palo Alto
Feb. 14-16
RAINBOWfest®

Don't panic if you missed our October RAINBOWfest in Princeton, N.J., or if you were there and can't wait for our next show. The first RAINBOWfest of 1986 will be Feb. 14-16 in Palo Alto, Calif. The Hyatt Regency will again be our host and, as usual, they're offering a special room rate of $71 per night, single or double. The advance ticket deadline for Palo Alto is Feb. 7.

The second RAINBOWfest of 1986 will be May 23-25 in Chicago. Rooms at the Hyatt Regency-Woodfield are $60, single or double, and the advance ticket deadline is May 16.

Be one of the first five people in your state to order tickets for either RAINBOWfest, and you'll receive a free RAINBOWfest T-shirt. If your order is one of the first 500, you'll receive a free Rainbow poster.

RAINBOWfest is the only computer show specifically dedicated to the Tandy Color Computer. Nowhere else will you see as many products, have immediate access to the top experts, or be able to attend free seminars of such import. It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox!

Every RAINBOWfest features many delightful surprises because it's a great opportunity for commercial programmers to show off new and innovative products for the very first time. You get the jump on new capabilities for your CoCo. In exhibit after exhibit, there are demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

To make it easier for you to participate, we schedule RAINBOWfests in three parts of the country. Since we've just met in Princeton, N.J., make plans now to join us in Palo Alto or Chicago next year. For members of the family who don't share your affinity for CoCo, you'll be glad to know that RAINBOWfest opens Friday evening. It is a daytime-only show Saturday: The CoCo Community Breakfast kicks off the festivities with a well-known speaker to keynote the highly popular affair. On Sunday the exhibit hall opens at 11 a.m. and closes at 4 p.m. These traditional gatherings allow you to catch up on significant happenings in the CoCo Community in an intimate setting.

Come to our next RAINBOWfest and help us all celebrate CoCo Community!

For more information contact our RAINBOWfest coordinator: Judy Brashear, (502) 228-4492.

Show Schedule:

Friday evening — Exhibits open from 7 p.m. to 10 p.m.

Saturday — CoCo Community Breakfast at 8 a.m.
Exhibits open at 10 a.m. and close at 6 p.m.

Sunday — Exhibits open from 11 a.m. to 4 p.m.

YES, I'm coming to **Palo Alto!** I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

____	Three-day tickets at $9 each	total ______
____	One-day tickets at $7 each Circle one: Friday Saturday Sunday	total ______
____	Saturday Breakfast at $12 each	total ______
	Handling Charge $1	$1.00
	TOTAL ENCLOSED	______

(U.S. Funds Only, Please)

☐ Also send me a hotel reservation card for the Hyatt Regency-Palo Alto ($71, single or double room).

Name (please print) ____________________
Address ____________________
City ____________________ State ________
Telephone ____________________ ZIP ________
Company ____________________
☐ Payment Enclosed, or ☐ Charge to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number ____________________
Exp. Date ____________________
Signature ____________________

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, the Falsoft Building, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, call: (502) 228-4492.

Advance ticket deadline: Feb. 7, 1986. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show.

```
45 X2=H:GOTO51
46 Z=H:A$=INKEY$:IFA$=CHR$(8)THE
NH=H-20ELSEIFA$=CHR$(9)THENH=H+2
0ELSEIFA$="Q"THEN57
47 IFH<47THENH=47ELSEIFH>207THEN
H=207
48 IFZ=H THENRETURN
49 LINE(Z-4,120)-(Z+4,120),PRESE
T:LINE(H-4,120)-(H+4,120),PSET:R
ETURN
50 GOSUB46:IFA$=CHR$(13)THENRETU
RNELSE50
51 IFX1>X2 AND PPOINT(X1,96)=8TH
ENSOUND1,1:GOTO42ELSEIFX2>X1 AND
 PPOINT(X1,96)=6THENSOUND1,1:GOT
O42
52 IFABS(X1-X2)>40THENSOUND1,1:G
OTO42
53 IF PPOINT(X2,96)<>5 THENSOUND
1,1:GOTO42ELSEC=PPOINT(X1,96):PA
INT(X2,96),C,3:PAINT(X1,96),1,3:
GOTO42
54 FORT=47TO107STEP20:IFPPOINT(T
,96)=6THENNEXT:GOTO55ELSERETURN
55 FORT=147TO207STEP20:IFPPOINT(
T,96)=8THENNEXT:GOTO56ELSERETURN
56 CLS:PRINT"YOU WIN!!!!!":GOTO5
8
57 CLS:PRINT"YOU'RE STUCK - YOU
LOSE!!!"
58 PRINT:PRINT:GOSUB84:GOTO39
59 FORT=1TO60:READA$:NEXT:DATA "
R80D120L80U120R80M-80,120","BR40
D120","R80D60L80D60R80","R80D60L
50R50D60L80","D60R80L20U60D120",
"R80L80D60R80D60L80","D120R80U60
L80","R80M-80,120","R80D60L80U60
D120R80U60","R80D120U60L80U60"
60 WW=0:FORA=0TO9:READA$(A):NEXT
:PMODE2:PCLS:S=2
61 PCLS:CLS:PRINTS"NUMBERS":LINE
INPUT"HIT ENTER TO BEGIN ";D$:SC
REEN1,1:AN$="":FORT=1TOS:N=RND(1
0)-1:PCLS:DRAW"BM88,35;"+A$(N):A
N$=AN$+STR$(N):FORG=1TO250:NEXTG
,T:INPUT"NUMBER SEQUENCE";SQ$:IF
SQ$=RIGHT$(AN$,S+(S-1))THEN64
62 IFWW=2THEN63ELSEPRINT"WRONG,
TRY AGAIN":WW=WW+1:FORT=1TO1000:
NEXT:GOTO61
63 PRINT"SORRY, GAME'S OVER.  HO
WEVER,  YOU DID REMEMBER";S-1;"
NUMBERS!":PRINT:GOSUB84:RESTORE:
GOTO59
64 FORT=1TO3:PRINT@236,"CORRECT"
:FORP=1TO100:NEXT:PRINT@236,"
   ":FORP=1TO70:NEXTP,T:S=S+1:W
W=0:GOTO61
65 IFK=1THEN69ELSEPRINT@482,"40
SECONDS TO SET THE SCREEN";
66 LINE-(0,30),PRESET:PMODE4:PCL
S:PMODE3:COLOR3,0:FORX=0TO255:Y=
30*ABS(COS(X/27.1)):LINE-(X,Y),P
SET:IFX/20=INT(X/20)THENLINE-(X,
70),PSET:LINE-(X,Y),PSET:NEXTELS
ENEXT
67 LINE(0,110)-(255,110),PSET:LI
NE(0,70)-(255,70),PSET:FORX=10TO
255STEP20:T=T+1:IFT/2=INT(T/2)TH
ENC=2ELSEC=4
68 PAINT(X,50),C,3:NEXT:PAINT(12
8,96),3,3:FOR X=0TO255STEP10:R=.
4:FORY=75TO105STEP10:CIRCLE(X,Y)
,4,RND(4),R:R=R+.15:NEXTY,X:GET(
0,0)-(255,112),X,G:K=1
69 N$=";C3BR6U6D2L12U2D6E4F4E4D4
H4G4H4":XN=RND(200)+40:CLS
70 PRINT"THE NET IS";XN;"METERS
AWAY.":INPUT"ANGLE OF CANNON(1-8
9)";A:IF A>89 OR A<1 THEN PRINT"
CAN'T DO THAT ANGLE!":GOTO70
71 V=110:V1=V:Y=180:X=0:A1=A*.01
754:PMODE4:PCLS:PMODE3:PUT(0,0)-
(255,112),X,PSET:DRAW"BM"+STR$(X
N)+",180"+N$:LINE(0,191)-(0,191)
,PRESET:COLOR4,0:N=5:O=2:PLAY"L2
55"
72 COLOR2,0:LINE(0,180)-(255,191
),PSET,BF:S=1:Z=114
73 LINE(0,Z)-(255,Z),PSET:Z=Z+S:
S=S*1.5:IF Z>180 THEN 74 ELSE 73
74 PMODE4:SCREEN1,1:PMODE3
75 COLOR4,0:LINE(0,174)-(6,180),
PSET,BF:PLAY"L255O2CDO3CDO1CDO2C
D"
76 LINE-(X,Y),PSET:Y1=Y:X=X+(V1*
SIN(A1*2)/10):Y=Y-(V*SIN(A1)/10)
:V=V-10:IF Y<0 THEN Y=0 ELSE IF
Y>180 THEN X=X-(V1*SIN(A1*2)/10)
:GOTO82
77 IF Y<Y1 THEN N=N+1 ELSE N=N-1
78 IF N>12 THEN N=1:O=O+1:IF O>5
 THEN O=5
79 IF N<1 THEN N=12:O=O-1:IF O<1
 THEN O=1
80 PLAY"O"+STR$(O)+";"+STR$(N)
81 GOTO76
82 CLS:IF X<XN+6 AND X>XN-6 THEN
 PLAY"O5L100CDEFGFEDCDEFGFEDCDEF
G":FOR T=1TO500:NEXT:PRINT"YOU G
OT IT!!!":GOTO 83 ELSE PLAY"L255
O1CDBBEBBFBBGBBCBB":FOR T=1TO500
:NEXT:PRINT"YOU MISSED BY ";-INT
(XN-X);"METERS":GOTO70
83 GOSUB84:GOTO69
84 INPUT"PLAY AGAIN (Y/N)";A$:IF
 A$<>"N" THEN RETURN ELSE 1
```

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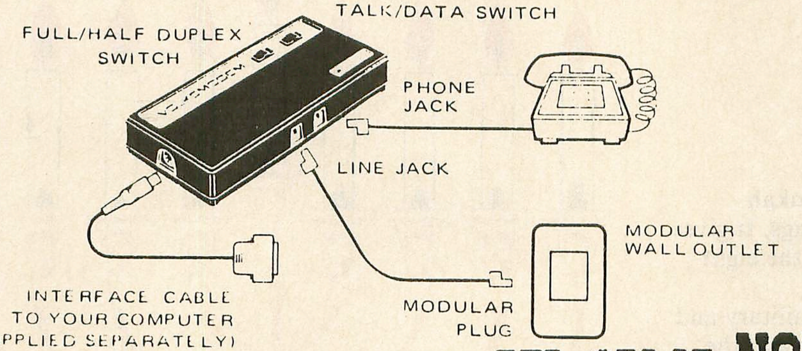

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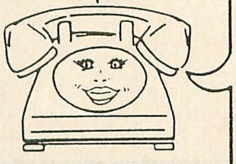

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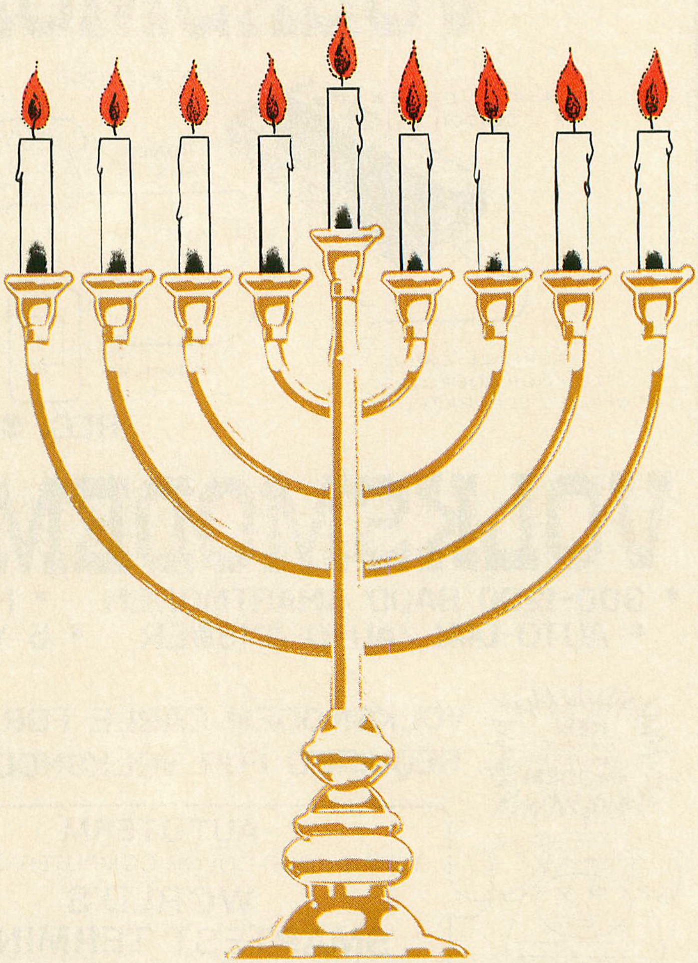
Observing the lighting of the menorah candles

The Eight Lights Of Chanukah

By Aryeh Glaberson



M*enorah* aids the user in lighting Chanukah candles and reciting the proper blessings. It gives a short history lesson of the origin of the eight-day observance and the menorah.

Chanukah commemorates the miraculous military and spiritual victories of the biblical Jewish people and the rededication of the Temple in Jerusalem.

Using the Program

After the history is given, press the numbers '1' through '8' consecutively for instructions on the ceremonial lighting of the menorah candles. Written directions include a graphics diagram to illustrate the appropriate procedure. After lighting is shown, the blessing recital appears on the screen in English along with the Hebrew phonetic pronunciation. When the flickering candles appear, press any key to continue.

(Any questions regarding this program may be directed to the author at 20 Celler Road, Edison, NJ 08817, phone 201-572-0324. Please include an SASE when writing.) ☐

(Aryeh Glaberson is a 12-year-old ninth grade student at Rabbi Jacob Joseph Yeshiva in Edison, N.J. He plans to become a Talmudic scholar.)

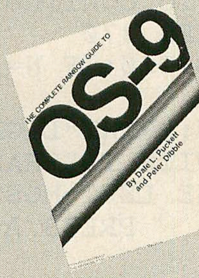
160	237
350	164
540	77
800	115
960	178
1050	217
END	11

The listing: MENORAH

```
5 REM ** CHANUKAH LIGHTS ***
6 REM ** BY ARYEH GLABERSON ***
10 PCLEAR6:PMODE3,1:PCLS
20 PRINT:PRINT"WAIT A MINUTE";
30 DIM CA(200),SH(300),FL(200),B
E(1000),AF(1000)
40 GOSUB 690:GOSUB 760:GOSUB 830
50 PCLS
60 CLS
70 PRINT:PRINT" CHANUKA CANDLE L
IGHTING GUIDE   "
80 PRINT:PRINT"   BY ARYEH GLABE
RSON"
90 PRINT:PRINT:PRINT:PRINT"
THIS PROGRAM AIDS THE USER  IN L
IGHTING chanuka CANDLES     AND
RECITING THE PROPER BLESS-  INGS
."
100 PRINT:PRINT"    PRESS A KEY
TO CONTINUE";
110 A$=INKEY$
120 IF A$="" THEN 110
130 CLS
140 PRINT:PRINT:PRINT:PRINT"WHAT
 NIGHT OF CHANUKAH IS IT ?  ": P
RINT"  ENTER 0 FOR A SHORT HISTO
RY     LESSON ";:PRINT"OR 1 THRU
 8 FOR THE       NIGHT OF CHANUK
```

Recommended Reading for Your CoCo from . . .

The Rainbow Bookshelf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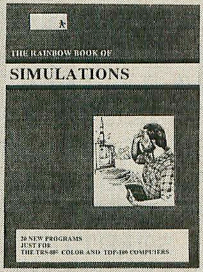
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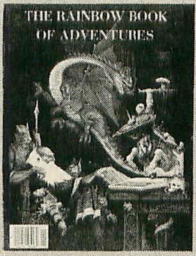

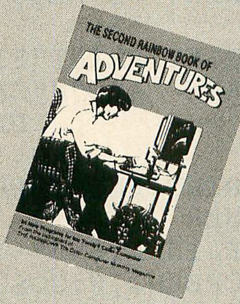

The Complete Rainbow Guide To OS-9

The book that demystifies the state-of-the-art operating system for the Tandy Color Computer. Authors Dale L. Puckett and Peter Dibble show you how to take advantage of OS-9's multi-tasking and multi-user features, and the capability of redirecting input and output commands at will. An easy-to-read, step-by-step guide packed with hints and tips, tutorials and free software in the form of program listings.
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```
AH";:INPUT N
150 IF N=0 GOTO 1050
155 IF N>8 THEN GOTO 130
160 'IF N=1 GOTO 200
170 CLS:PRINT:PRINT"  TONIGHT WE
 LIGHT"N"CANDLES     PLUS THE SHA
MASH;"
180 IF N=1 THEN PRINT"WE ALSO SA
Y THREE BLESSINGS."ELSE IF N<>1
THENPRINT"WE ALSO SAY TWO BLESSI
NGS."
190 PRINT:PRINT"FIRST PUT IN THE
 SHAMASH  AND"N"CANDLES STARTING
 FROM THE        EXTREME RIGHT EN
D."
200 PRINT:PRINT"PRESS A KEY TO C
ONTINUE"
210 IF INKEY$="" THEN 210
220 SCREEN1,0:GOSUB 560
230 PUT(40,55)-(50,100),CA,PSET
240 FOR I=200 TO 200-((N-1)*20)
STEP -20
250 PUT(I,65)-(I+10,110),CA,PSET
260 FOR D=1 TO 250:NEXT D
270 NEXT I
280 FOR D=1 TO 2500:NEXT D
290 CLS:PRINT:PRINT"  THEN LIGHT
 THE SHAMASH.":PRINT"      PRESS
A KEY TO CONTINUE"
300 IF INKEY$="" THEN 300
310 PCOPY 2 TO 5
320 SCREEN1,0
330 PUT(40,55)-(50,100),CA,PSET
340 PUT(40,40)-(50,60),FL,PSET
350 FOR I=1 TO 1500:NEXT I
360 CLS:PRINT:PRINT:PRINT"  NOW
RECITE THE TWO BLESSINGS":PRINT:
PRINT" PRESS A KEY TO CONTINUE"
370 IF INKEY$="" THEN 370
380 GOSUB 890:GOSUB 950:IF N=1 T
HEN GOSUB 1000
390 CLS:PRINT:PRINT:PRINT"LIGHT
THE OTHER CANDLES WITH THESHAMAS
H, STARTING WITH THE LEFT-MOST C
ANDLE":PRINT:PRINT"   PRESS A KE
Y TO CONTINUE"
400 IF INKEY$="" THEN 400
410 SCREEN1,0
420 FORKK=1TO1000:NEXTKK
430 LINE(40,100)-(50,40),PRESET,
BF
440 FOR D=1 TO 300:NEXT D
450 FOR I=210-((N-1)*20) TO 210
STEP 20
460 PUT(I-10,50)-(I+40,70),SH,PS
ET
470 FOR D=1 TO 250:NEXT D
480 LINE(I,50)-(I+40,70),PRESET,
BF
490 NEXT I
500 PUT(40,55)-(50,100),CA,PSET
510 PUT(40,40)-(50,60),FL,PSET
520 PCOPY 2 TO 6
530 GOTO 550
540 IN$=INKEY$:PCOPY 5 TO 2:PCOP
Y 6 TO 2:IF INKEY$=""THEN 540 EL
SE PCLS:GOTO130
550 GOTO 540
560 'MAKE MENORAH****
570 COLOR 4
580 LINE(100,170)-(150,170),PSET
590 LINE-(140,160),PSET
600 LINE-(110,160),PSET
610 LINE-(100,170),PSET
620 LINE(120,160)-(130,130),PSET
,B
630 LINE(40,130)-(210,120),PSET,
B
640 LINE(40,120)-(50,100),PSET,B
650 FOR I=60 TO 200 STEP 20
660 LINE(I,120)-(I+10,110),PSET,
B
670 NEXT I
680 RETURN
690 'MAKE CANDLE ****
700 COLOR 3
710 LINE(40,100)-(50,60),PSET,BF
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send an SASE to: Submissions Editor, THE RAINBOW, The Falsoft Building, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

```
720 LINE(45,60)-(45,55),PSET
730 COLOR 4
740 GET(40,55)-(50,100),CA,G
750 RETURN
760 'MAKE FLAME  ****
770 COLOR 2
780 CIRCLE(45,50),3,2,2
790 CIRCLE(45,50),5,2,2
800 CIRCLE(45,50),1,2,2
810 GET(40,35)-(50,60),FL,G
820 RETURN
830 'MAKE SHAMASH****
840 COLOR 3
850 LINE(170,60)-(210,70),PSET,B
F
860 PUT (160,50)-(170,70),FL,PSE
T
870 GET(160,50)-(210,70),SH,G
880 RETURN
890 '1ST BLESSING
900 CLS:PRINT"BAH-RUCH AH-TAH AH
-DO-NOY, ELO-HAY-NU ME-LECH HAH-
O-LAHM, AH-SHER KEED-SHAH-NU B-M
ITZ-VO-TAHV, V-TSI-VAH-NU L-HAHD
-LEEK NAYR SHEL CHANUKAH"
910 PRINT:PRINT:PRINT"BLESSED AR
T THOU, - THE ETERNAL OUR G-D, K
ING OF THE UNIVERSE WHO HAS SANC
TIFIED US WITH HIS COMMANDMENTS,
 AND CHARGED US TO LIGHT THE CHA
NUKAH LIGHTS."
920 PLAY"O2T2GCDEDCCP4CDEEGGFEDP
4O1GO2FEDCO1BO2CDEDP4EFEFGAGDFED
C"
930 FOR KK=1 TO 1000:NEXT KK
940 RETURN
950 '2ND BLESSING
960 CLS:PRINT"BAH-RUCH AH-TAH AH
-DO-NOY, ELO-HAY-NU ME-LECH HAH-
O-LAHM, SHE-AH-SAH NEE-SEEM LAH-
AH-VO-TAY-NU, BAH-YAH-MEEM HAH-H
AYM BAH-ZMAHN HAH-ZEH
970 PRINT:PRINT:PRINT"BLESSED AR
T THOU, - THE ETERNAL, OUR G-D,
KING OF THE UNIVERSE, WHO WROUGH
T MIRACLES FOR OUR FORFATHERS IN
 FORMER DAYS, AT THIS SEASON."
980 PLAY"O2T2GCDEDCCP4CDEEGGFEDP
4O1GO2FEDCO1BO2CDEDP4EFEFGAGDFED
C"
990 RETURN
1000 '3RD BLESSING
1010 CLS:PRINT"BAH-RUCH AH-TAH A
H-DO-NOY, ELO-HAY-NU ME-LECH HAH
-O-LAHM, SHE-HEH-CHEE-YAH-NU V-K
EE-EE-MAH-NU, V-HEE-GEE-YAH-NU L
AH-ZMAHN HAH-ZEH
1020 PRINT:PRINT:PRINT"BLESSED A
RT THOU, - THE ETERNAL, OUR G-D,
KING OF THE UNIVERSE, WHO HAS PR
ESERVED US ALIVE, SUSTAINED US,
AND CAUSED US TO ATTAIN THIS SEA
SON."
1030 PLAY"O2T2GCDEDCCP4CDEEGGFED
P4O1GO2FEDCO1BO2CDEDP4EFEFGAGDFE
DC"
1040 RETURN
1050 CLS:PRINT"APPROXIMATELY 230
0 YEARS AGO A SMALL BAND OF JEWI
SH PATRIOTS MANAGED TO FREE THEI
R COUNTRY FROM GREEK DOMINATION
FIGHTING THE OVERWHELMING MILITA
RY SUPERIORITY OF THE GREEK EMPI
RE."
1060 PRINT"AFTER THE MILITARY VI
CTORY THE HOLY TEMPLE IN JERUSAL
EM WAS CLEANSED OF PAGAN INFLUEN
CES AND THE MENORAH - THE EIGHT
BRANCHED CANDELABRA - WAS KINDLE
D."
1070 PRINT:PRINT:PRINT"PRESS KEY
 TO CONTINUE"
1080 IF INKEY$="" THEN 1080
1090 CLS:PRINT"ALTHOUGH RITUALLY
 PURE OIL, SUFFICIENT FOR ONLY O
NE NIGHT'S LIGHTING, WAS FOUND,
IT MIRACULASELY SUFFICED FOR EIG
HT DAYS."
1100 PRINT"THE HOLIDAY OF CHANUK
AH IS CELEBRATED IN COMMEMORATIO
N OF THE MIRACULOUS MILITARY AND
 SPIRITUAL VICTORIES, THE REDEDI
CATION OF THE TEMPLE AND THE IND
EPENDANCE OF THE NATION."
1110 PRINT:PRINT:PRINT"PRESS KEY
 TO RETURN"
1120 IF INKEY$=""THEN GOTO 1120
1130 GOTO 130
```

One-Liner Contest Winner . . .

Silly demonstrates the kind of fast animation that the CoCo can produce.

The listing:

```
10 PCLEAR8:PMODE4,5:PCLS:PMODE,1
:PCLS:P=2:X=4:Y=4:FORK=0TO6STEP.
128:PMODE0,O+1:O=O+1AND7:X=COS(K
)*90+128:Y=SIN(K)*20+96:XX=COS(6
-K)*20+128:YY=SIN(6-K)*90+96:LIN
E(X,Y)-(XX,YY),PSET:SCREEN1:NEXT
:FORE=1TO1E9:PMODE0,(7ANDE)+1:SC
REEN1:PLAY"P255":NEXT
```

Joe Porkka
Highland, MI

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you find in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on the table of contents and at the beginning of articles indicates that the program is available through our RAINBOW ON TAPE service. An order form for this service is on the insert card bound in the magazine.

What's A CoCo

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

The Rainbow Check Plus

The small box you see accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately. *Rainbow Check PLUS* counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS,* type in the program and CSAVE it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down-arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into your CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand-assemble some programs.

Use the following program if you wish to hand-assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7F80.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has been physically seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

BARBAROSSA

THE WAR IN RUSSIA 1941-44

The first 64K wargame for the color computer. Barbarossa is total machine language so it's fast! Completely hi-res so it's beautiful. Scrolling map takes up more than two screens. Bit mapping allows for hi-res picto-character set consisting of panzer, grenadier, airflottes, infantry, mechanized infantry, Russian armor and infantry. Commands include Normal Movement, Blitzkreig attack, Cityscan, Intelligence, Air Operations, Scrolling, Group transfer, Advance 2nd movement, Game save.

Player controls the German forces consisting of Army Groups North, Central and South, and must capture 16 Russian cities to win. *In doing* so he battles terrible weather conditions, attrition, Russian reserves and supply shortages.

Disk ($33.95) and Cassette ($30.95) versions are different.

PHALANX By John Galus. 32K Hi-res ML game circa Alexander the Great. Bit mapped graphics. Player controls Cavalry, Archers, Phalanxes in an attempt to out manuever and out fox the enemy. Choose Attack, Defensive, Normal or Range stance for combat on any of three battlefields. Disk ($30.95) and Cassette ($27.95) versions are different.

D-DAY THE 6th of JUNE By Phil Keller. 64K Hi-Res ML game (See Barbarossa for graphics information). Player designs order of battle consisting of Rangers, Infantry, Armor, Recon, Fighter Bombers, Airborne and Artillery. Bit mapped graphics. A host of options including air support and naval battery fire. You even get to see things explode. Disk ($33.95) and Cassette ($30.95) versions are different.

ANIZO 32K By Carl Carpenter. Game of the Italian Campaign for 1 or 2 players where Churchill's "soft underbelly of Europe" became Mark Clarke's "tough old gut". Our first simultaneous movement game. All units historically portrayed. Disk ($28.95) and Cassette ($25.95) versions are different.

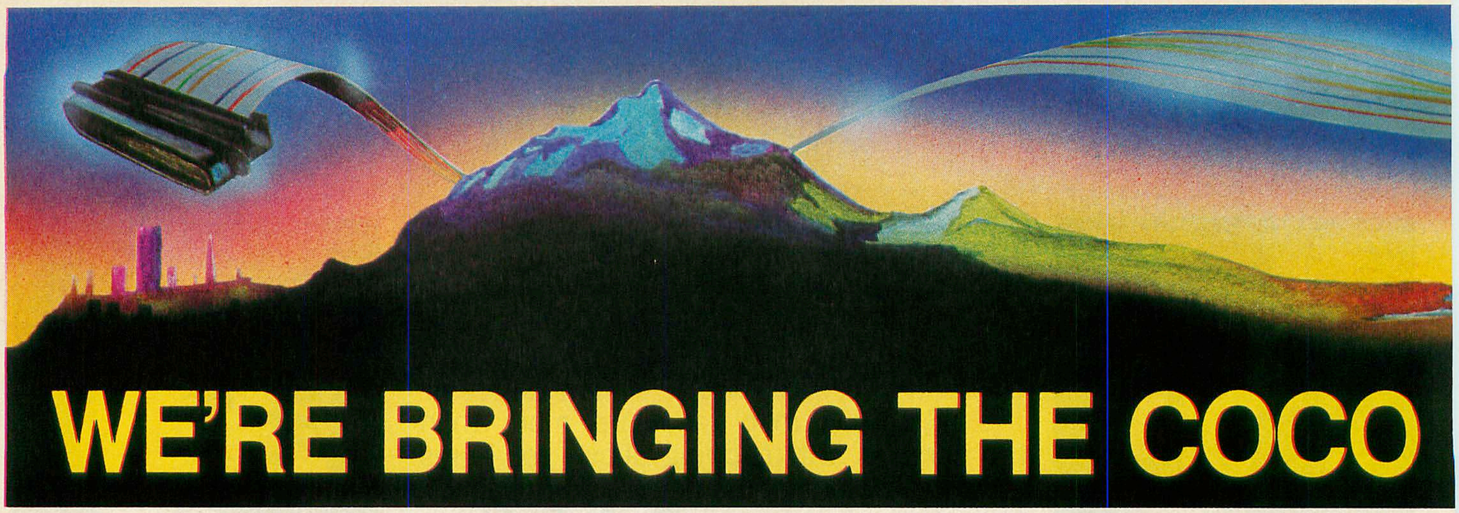
ARK
ROYAL
GAMES

14 Other War Games Available — Write For Free Catalog

DEALER DISCOUNT AVAILABLE

Prices on all products include shipping on prepaid orders to USA, APO's and Canada. Others add 5%. COD's accepted (add $3.50) in USA only. No bankcards, please. All orders shipped 1st Class within 24 hours. All programs available for use with Color Computer TM(Tandy Corp) or TDP System 100 ComPuter TM(RCA). Unless stated otherwise, program requires 32K and Extended Color Basic.

P. O. Box 14806
Jacksonville, FL 32238
(904) 786-8603



RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $20 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Fred Scerbo, Dan Downard, Ed Ellers, Lonnie Falk, Dick White, Tony DiStefano and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $29.95 value — and a free hour of connect time — a $6 value at either 300 or 1200 Baud during evening, holiday and weekend hours — so you can sample Delphi and the brand new RAINBOW CoCo SIG. **That's right. Your subscription to THE RAINBOW entitles you to this $35.95 value as a *free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

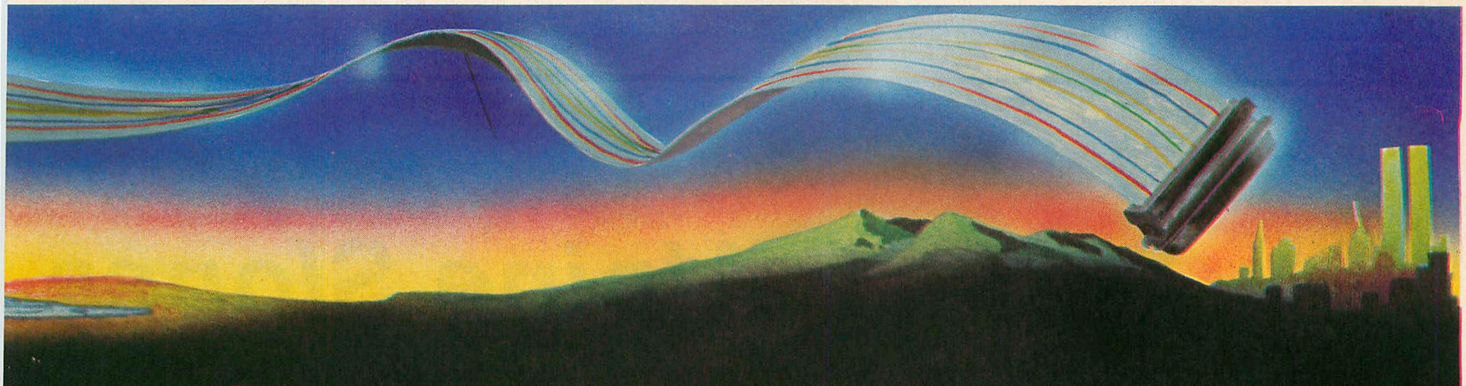
SAVE EVEN MORE

Want to save an extra $15? While you're online, you can order the *Delphi Handbook and Command Card* ($21.95) and three hours of connect time ($18) for only $24.95.

Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

DELPHI

TYPE:
GROUP COCO



COMMUNITY TOGETHER!

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks, like Uninet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use (there is no charge for any of them, unless you have to make a long-distance call) and follow the instructions below:

On Uninet: Call (800) 821-5340 to get the Uninet number for your area. After you call the appropriate number for your own area and make connection, you'll see a prompt of "L?" Press ENTER, the period key (.) and ENTER again. At the "service:" prompt, type `GVC` (for General Videotex Corporation) and ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud), type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER.

From other countries: Many countries have their own data networks that can connect to either Uninet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 312561703088 through Uninet, or 310600601500 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `RAINBOWSUB` and press ENTER. At the "PASSWORD:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `RAINBOWORDER` and press ENTER. At the "PASSWORD:" *prompt, type* `SENDSUB` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just press ENTER and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

Come Visit Us! Type: `GROUP COCO`

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password. No time is assessed against your free hour of service while you answer these questions.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen user name and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it. Again, there is *no charge* for the time you spend configuring your account. Your hour of free time starts after Max bids you goodbye.

You'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

Alpine Slopes

A small amount of memory for the big thrill of skiing . . .

By Mark Sabbatini

The 4K Color Computer is all but ignored today. There is almost no software written or available for it and magazines pay little, if any, attention to it. *Alpine Slopes* is an action game that fits into 4K of memory. There are many programming techniques used to fit the program into 4K that should be helpful to beginning programmers.

When you first run the program, a title screen appears showing the present highest score and the score of the last game played. Upon pressing a key, you are asked several questions on what type of course you want to ski. The difficulty level allows you to start at zero, 200 and 400 yards down the course, depending on the level set. The fast or slow option can only be used if your computer can handle the `POKE 65495,0`. Otherwise, leave it out of the program. The third question determines what type of race you are running and your score is kept accordingly. The fourth question determines how far down the slope you can see.

After the fourth prompt, an orange block appears at the top of the screen. Use the left- and right-arrow keys to move the skier back and forth. There's no need to press the keys repeatedly, just hold them down. As you move down the slope different objects appear. The most common of these are trees. They start out as bushes, but continue to get larger. Also, as you move down the course your distance is marked every 10 yards. You must avoid these yard markers.

(Mark Sabbatini is a student at Mountain Open High School in Conifer, Colo. He enjoys skiing, backpacking and computer programming.)

"The CBASIC Compiler"

Now anyone can create fast efficient Machine Language Programs Easily and Quickly without having to use an Editor/Assembler

CBASIC is a fully integrated, easy to use Basic program Editor and Compiler package. CBASIC is 99% syntax compatible with Disk Extended Color Basic programs, so most Basic programs can be loaded and compiled by CBASIC with little or no changes required. The compiler is an optomizing two-pass integer Basic compiler that can convert programs written in Disk Extended Color Basic into 100% pure 6809 Machine Language programs which are written directly to disk in a LOADM compatible format.

The programs generated by the compiler can be run as complete stand alone programs. A built-in linker/editor will automatically select one and only one copy of each subroutine that is required from the internal run-time library and insert them directly in the program. This eliminates the need for cumbersome, often wasteful separate "run-time" packages.

CBASIC WAS DESIGNED FOR BOTH BEGINNING & ADVANCED USERS

CBASIC is a Powerful tool for the Beginner or Novice programmer as well as the Advanced Basic or Machine Language programmer. The Beginner or Novice programmer can write and compile programs without having to worry about Stack Pointers, DP registers, memory allocation, and so on, because CBASIC will handle it for you automatically. All they have to do is write their programs using the standard Basic statements and syntax. For the advanced Basic and Machine Language programmers, CBASIC will let you take command and control every aspect of your program, even generating machine code directly in a program for specialized routines or functions.

CBASIC adds many features not found in Color Basic, like Interrupt, Reset, and On Error handling. It also has advanced programming features that allow machine level control of the Stack and Direct Page registers, variable allocation, automatic 64K RAM control, program origin and even multiple origins. It can even have machine language code generated within a program that executes just like any other Basic program line.

FULL COMMAND SUPPORT & SPEED

CBASIC features well over 100 Basic Commands and Functions that fully support Disk, Tape, Printer and Screen I/O. It also supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, and all with 99.9% syntax compatibility.

CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes". Another user reported a program that took 1 to 1½ hours to run in Basic, now runs in 5 to 6 minutes!!!

MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequencial lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log". If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word-Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics, Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates a complete, Ready to Run machine language program. The finished product or program does not have to be interfaced to a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the other Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic program in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled program to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compiled into a single machine language program that does not require any kind of Basic program to make it work.

COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. What does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does not use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is why CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASIC allocates space for strings, it must know how much space to use for each string. When you Dimension a string variable in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 strings, 64 characters each, you would DIM DA$(40,64). If a string is not dimensioned, CBASIC will automatically allocate 32 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX$(200). For string arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DA$, you would still use DA$(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements or less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compilers, you have to declare EVERY string variable used in the progrm in a DIM statement. And, to create an array of 40 strings with 64 characters each, you would have to DIM AD$(2560), and then to access string #30, you would have to multiply 30 × 64 and use a special variable name format or access it one character at a time. Not very compatible or convenient to use, and difficult at best.

CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K. CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Programs compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you talk about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User Friendly compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, but comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consists of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on a page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index breaks down each section of the manual and gives a 3 or 4 word description of each section and its items along with page numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsections, with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you are looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual itself is an 8½ by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBASIC users describe the manual as being the Best program manual they have ever used.

COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Computer. Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC to other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't write much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at all? How large of a program can you write? Can you compile a complex string like: MID$(RIGHT$(DA$(VAL(IN$),LEN(LE$)),3,3)? Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphics statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separate Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they work? How do you edit a program when it has errors compiling?

PRICE VERSUS PERFORMANCE

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Basic compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market and have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of those traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Basic compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of $149.00 plus $3.00 for shipping and handling to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

CER-COMP
5566 Ricochet Ave.
Las Vegas, NV 89110
(702) 452-0632

Helpful objects include blue ski jumps, which move the skier ahead 50 yards. If you are racing slalom, gates will appear. Every gate you go through adds 100 points to your score. Once in a while the program will not give credit for hitting a slalom gate or a jump. Try to hit them head on to increase your chances of success. Once you run into something other than a ski jump or gate, the game is over.

Once the game is over, your yard total is added to the score one yard at a time. In a downhill race you will receive two points for every yard gained. If you want to skip the totaling process, press a key and the title screen appears. If your machine cannot handle the `POKE` here, leave it out. If you have the high score, it is indicated in reverse video. Press any key for another game.

Program Techniques

One of the most important requirements in an action game is speed. But in a game like this, there are often up to 15 or 20 objects on the screen at the same time. How does a simple program such as this manage to attain its speed? The answer is simple and often overlooked. The screen scrolls up every time it is filled. By printing 31 black spaces at the bottom of the screen, the program simulates movement.

One of the biggest aggravations I suffer in some programs is that after the game is over, I often accidentally press a key, thus causing the title screen or other to be missed. I avoided this in *Alpine Slopes* by putting in extra `INKEY$` statements to help guard against accidental input.

The breakdown of the program lines is as follows:

130	—	Set high score to zero
140-300	—	Initialize game
340	—	Check for keyboard input
350	—	Position skier
360	—	Print skier
370	—	Check to see if skier hit jump or gate and give appropriate result
380	—	Check to see if skier hit tree or yard marker
390	—	Print tree
410	—	Random action to put gate or jump on screen
420	—	Scroll screen
430	—	Print yard marker
440	—	Add one to yard score
450	—	Determine tree size
480	—	Erase skier
490	—	Repeat loop
500-520	—	Game over and title screen
530-540	—	Set up new game

I think *Alpine Slopes* shows part of what can be done with 4K of memory. I hope this article inspires some 4K programmers. If you have any questions you may call or write me at 12139 Circle Drive, Conifer, CO 80433, (303) 838-7042. Please include an SASE when writing. ☐

The listing: ALPSLOPE

380 123
506 170
END 36

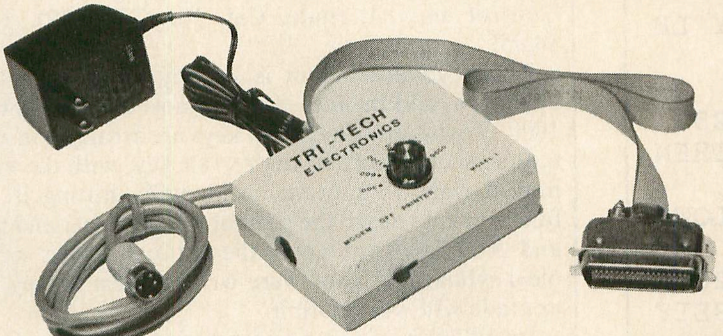
```
130 HI=0
131 GOTO510
140 CLS0:Q=28:H=1:FORA=1 TO31:Y$
=Y$+CHR$(128):NEXT:P$=CHR$(175):
FORA=1TO2:P$=P$+P$:NEXT:SL=1:S=0
:N=0
141 IFQQ=2THENN=200ELSEIFQQ=3THE
NN=400
240 L$=CHR$(8):R$=CHR$(9)
260 J$(1)=CHR$(215)+CHR$(219):J$
(2)=CHR$(215)+CHR$(223)+CHR$(219
):J$(3)=CHR$(215)+CHR$(223)+CHR$
(223)+CHR$(219):J$(4)=CHR$(215)+
CHR$(223)+CHR$(223)+CHR$(223)+CH
R$(219)
300 A=15:B=30:M=1:C$=CHR$(128)
340 IF(PEEK(343)AND8)=0THENX$=L$
ELSEIF(PEEK(344)AND8)=0THENX$=R$
ELSEX$=CHR$(133)
350 IFX$=L$ANDA>0THENZ$=CHR$(246
):A=A-1:B=B-2ELSEIFX$=R$ANDA<30T
HENZ$=CHR$(249):A=A+1:B=B+2 ELSE
Z$=CHR$(245)
360 PRINT@A,C$+Z$+C$;
370 IFPOINT(B+2,2)=3THENN=N+40:E
=E+40:FORL=240TO1STEP-20:PRINT@4
80,Y$:SOUNDL,1:NEXTL:GOTO390ELSE
IFPOINT(B+2,2)=2THENS=S+100:SOUN
D150,1:GOTO390
380 IFPOINT(B+2,2)<>0ORPOINT(B+3
,2)<>0THEN500
390 PRINT@VI+RND(Q+1),J$(H);
410 P=RND(30):IFP=1THENPRINT@VI-
1+RND(26),P$;ELSEIFP<7 ANDSR=1 T
HENPRINT@VI-1+RND(32),CHR$(159);
420 PRINT@480,Y$
430 IFN/10=INT(N/10)THENPRINT@VI
+RND(Q),N;:FORT=1TO40:NEXT:PRINT
@480,Y$
440 N=N+1
450 IFN>199THENH=2ELSEIFN>399THE
NH=3ELSEIFN>699THENH=4
480 PRINT@A,C$+Z$+C$;
490 GOTO340
500 FORX=1TO15:SOUNDRND(10)*15,1
:SET(A+A+RND(3),RND(3),RND(8)):N
EXT
501 N=N-13:CLS:PRINT@139,"YARDS"
N:PRINT@267,"SCORE";S:FORXX=1TO5
00:NEXT:QQ$=INKEY$
502 POKE65495,0:FORZZ=1 TON:IFSR
=1 THENS=S+1:N=N-1ELSES=S+2:N=N-
1
503 PRINT@144,N"     ":PRINT@272,
S:SOUND50,1:IFINKEY$<>""THEN505
ELSENEXTZZ
504 POKE65494,0:FORXX=1 TO200:NE
XTXX:GOTO510
505 S=S+N
506 IFSR=0 THENS=S+N
```

PARALLEL PRINTER INTERFACE

WORKS WITH ALL STANDARD PARALLEL PRINTERS

POWER SUPPLY not needed with Gemini printers

SWITCH SELECTABLE BAUD RATES FROM 300 TO 9600



COMPUTER CONNECTOR

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```
510 POKE65494,0:CLS:PRINT@73,"al
pine slopes":PRINT@171,"SCORE"S:
IFS>HS THENHS=S:IV=1
511 IFIV=1THENPRINT@264,"high sc
ore";HS ELSEPRINT@264,"HIGH SCOR
E"HS
515 PRINT@389,"PRESS ANY KEY TO
PLAY"
520 IV=0:Q$=INKEY$
521 Q$=INKEY$:IFQ$=""THEN521
523 CLS:PRINT@133,"DIFFICULTY LE
VEL (1-3)"
524 QQ$=INKEY$
525 QQ$=INKEY$:IFQQ$=""THEN525
526 QQ=VAL(QQ$):IFQQ<1ORQQ>3THEN
525
527 PRINT@200,"(F)AST OR (S)LOW"
:QQ$=INKEY$
528 QQ$=INKEY$:IFQQ$=""THEN528EL
SEIFQQ$="F"THENPOKE65495,0ELSEIF
QQ$<>"S"THEN528
530 PRINT@261,"(S)LOLOM OR (D)OW
NHILL"
531 QQ$=INKEY$
532 QQ$=INKEY$:IFQQ$=""THEN532EL
SEIFQQ$="D"THENSR=0 ELSESR=1
533 PRINT@322,"VISIBLITY (1- GOO
D 4- BAD)"
534 QQ$=INKEY$
535 QQ$=INKEY$:IFQQ$=""THEN535
536 WW=VAL(QQ$):IFWW<1OR WW>4THE
N535
537 IFWW=1 THENVI=448ELSEIFWW=2
THENVI=354ELSEIFWW=3THEN VI=224E
LSEVI=128
540 Y$="":P$="":GOTO140
```

Corrections

"Screen Pokes Made Easy" (November 1985, Page 162): Bill Bernico has informed us that there are two minor errors in the text. The listing referred to as *SCRNPOKE* in the text should actually be called *TITLPOKE*; the reference mode to Listing 1 should really be Listing 2 (*DEMOPOKE*).

***CINCPAC — Battle Of Midway* (August 1985, Page 198):** H. Lawrence Elman tells us that the program fix he gave in his *review* is in error. The correct line should be:

```
1186 IF A$="S" THEN 1196 ELSE IF
 A$<"1" OR A$>"9" OR IF VAL(A$)>
(UC+1) THEN 1185
```

Hint . . .

Cheap Keyboard

Most CoCo owners are disappointed over the lack of a good keyboard supplied with their machine. However, a lot of people do not want to spend $80 on a keyboard for their $160 CoCo. Look no further! Radio Shack is selling [while supplies last] a keyboard with 57 keys (2 function keys, Control and Alternate, Cat. No. 277-1019). The price? $4.95!

The keyboard layout is slightly better than the CoCo keyboard, and the feel of it is almost as good as the Model 1000's keyboard. The arrow keys are arranged in a diamond pattern to the right of the ENTER key, with the BREAK key moved right to prevent accidentally hitting it. The two function keys are to the right of the space bar and the CTRL and ALT keys are where the vertical arrows were on the old keyboard. All software written for a 57-key keyboard upgrade will work with it.

Installation of the new keyboard is simple. Unplug the CoCo and flip it on its back. Unscrew all the screws (last one under the warning label) and put some tape over each screw hole so they won't fall out. Then flip it right-side-up and remove the cover. Lift the old keyboard off its posts and pull the keyboard's cable out of its connection. Save the keyboard someplace safe and remove the new keyboard from its packaging. If you have a newer CoCo (October 1985 or later) the new keyboard's cable will plug into the existing connector. Otherwise, you will need two pieces of cardboard (½ inch by 2 inches). Bend all the connector pins down against the board, making sure they are straight and parallel to each other. Then, slip the new keyboard's cable under the pins and line them up with the traces on the cable. Move the first piece of cardboard in between the cable and the board, and realign the cable with pins. Put the second piece of cardboard in between the first piece of cardboard and the cable. Make one last check to see that the cable is aligned with the connector pins, then put the keyboard on its posts.

After putting the new keyboard on its post, close your CoCo and power it up. Test every key — the cursor should at least turn back orange. If some or all of the keys don't work, unplug your CoCo and check the connector and cable. If you still have problems, I can be reached on Tuesday evenings at (315) 689-7864.

— Mike Sweet
Elbridge, NY

See You AT
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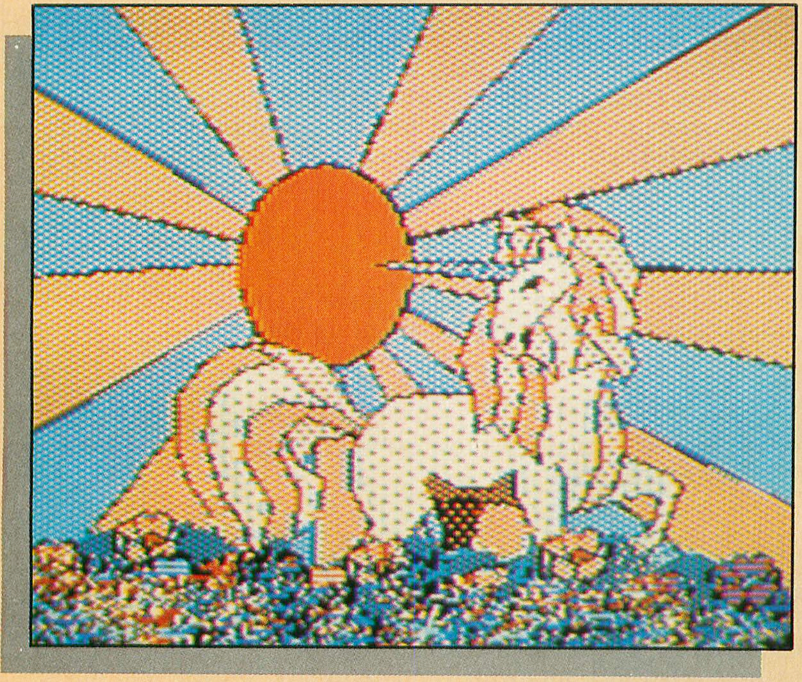
The CoCo Gallery

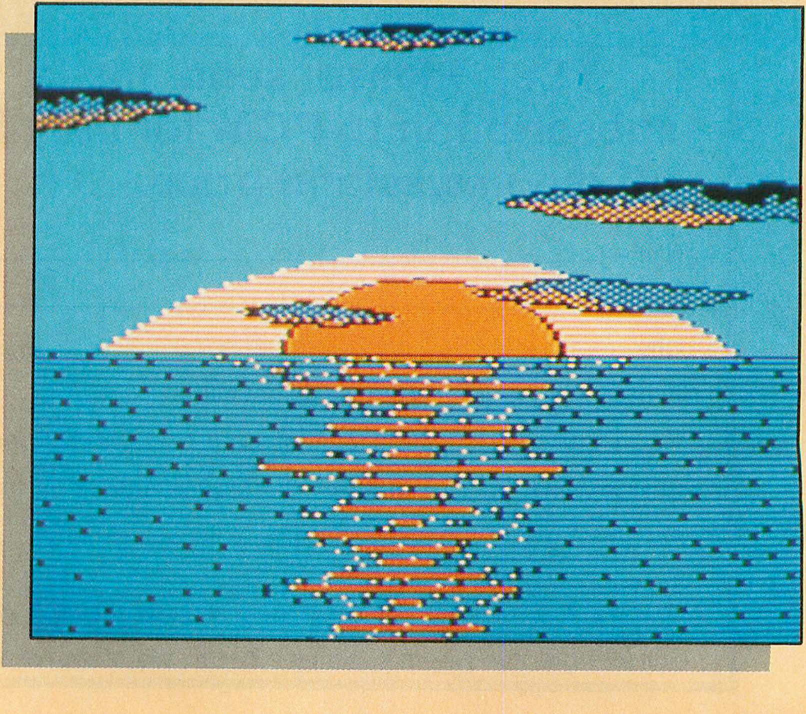


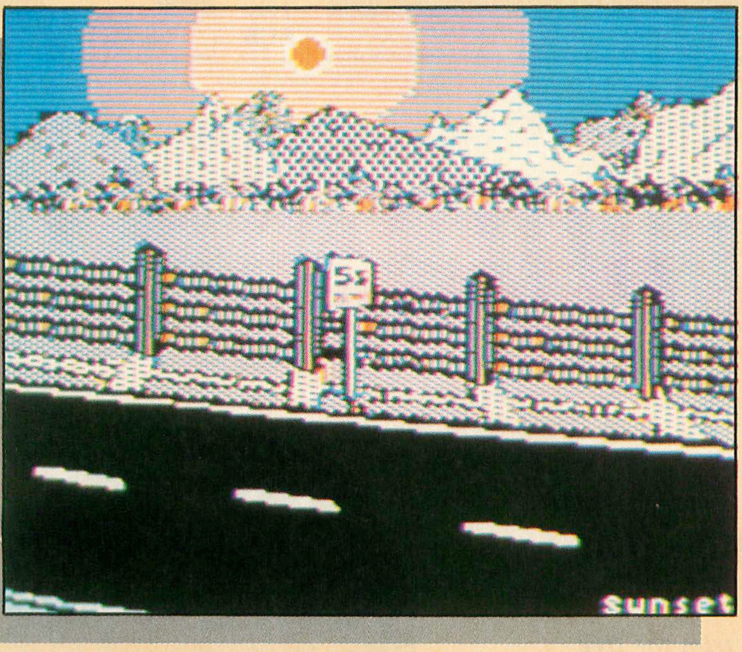
1st PRIZE

Charlie Fulp
Unicorn
Our Holiday edition of CoCo Gallery celebrates the sun with this striking rendition of a noble unicorn prancing in the golden rays. Charlie used *CoCo Max* to create our first prize winner. He lives in South Boston, Va.

2nd PRIZE

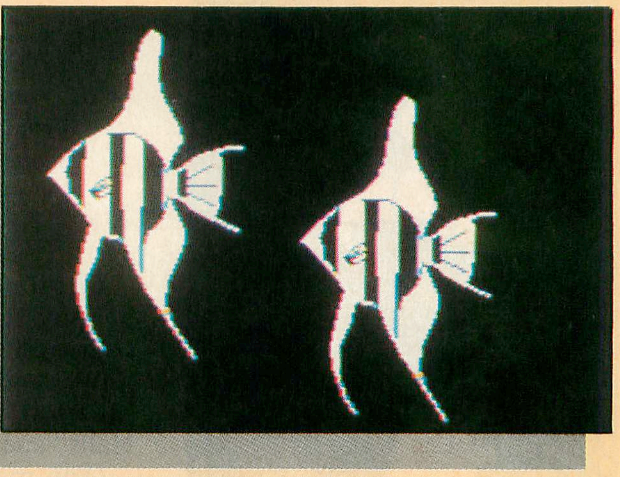
Devon Copley
Sunset
Devon continues our paean to Sol with this serene sunset from a thalassic point of view. Devon used Extended BASIC and *Micropainter* to achieve this beautiful scene. Devon lives in Amherst, N.Y.





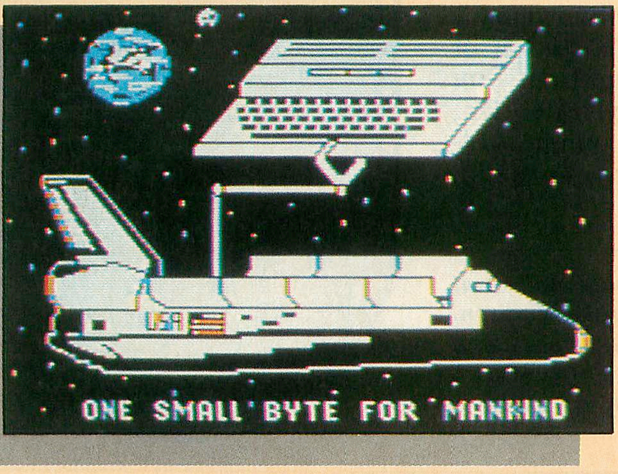
3rd PRIZE

Sean McDonough
Roadside Sunset
From Hillsboro, Ohio, Sean gives the gallery a picturesque representation of a sierra sunset beside an archetypical highway. Sean used *Graphicom* and a BASIC program he wrote for this modern American vista.



HONORABLE MENTION

Clinton Kajinami
Angelfish
Clinton used Extended Color BASIC for this submission to the gallery and informs us that he used the advantage of having four live models who share his home in Walton, Kan.


USA
ONE SMALL BYTE FOR MANKIND

HONORABLE MENTION

George Aloia
A Small Byte for Mankind
George lives in Margate, Fla., and used *CoCo Max* to round out our Holiday Gallery with this delightfully surrealistic depiction of the Space Shuttle deploying its arm.

SHOWCASE YOUR BEST!

You are invited to nominate original work for inclusion in upcoming showings of CoCo Gallery. Share your creations with the CoCo Community!

Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere.

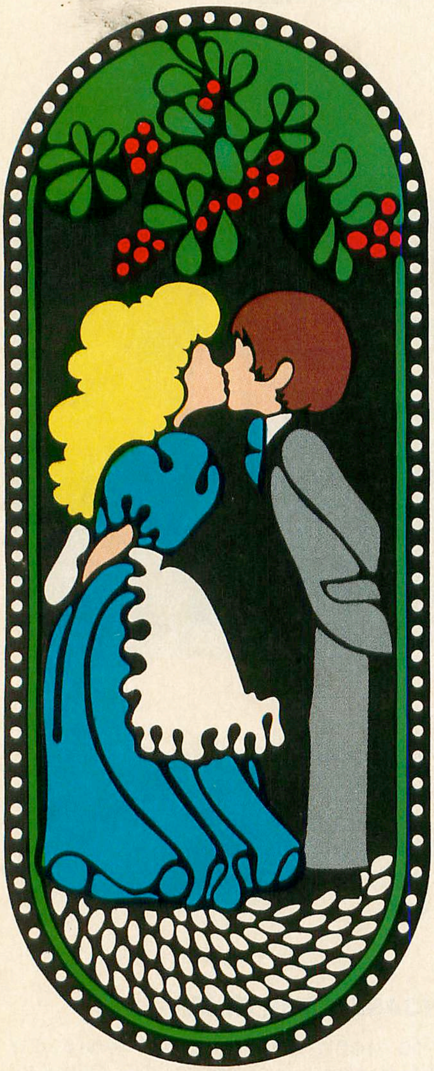
We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions will also be given.

Send your entry on either tape or disk to:
CoCo Gallery
THE RAINBOW
P.O. Box 385
Prospect, KY 40059
Attn: Monica Dorth

16K ECB

A celebration with music and graphics . . .

Christmas Pageantry



By Mike Hall

Let's trim the tree
And kiss under the mistletoe!
CoCo can dress up the festivities
With a Christmas Show —
Some music and graphics
That will add
To the season's glow.

Christmas Show displays various holiday scenes accompanied with traditional tunes of the season. Songs include "We Wish You a Merry Christmas," "Deck the Halls" and "Frosty the Snowman."

(You may contact the author of this program with questions you may have at 3019 Sylvester Dr., Hartland, WI 53029, phone 414-367-6186. Please enclose an SASE when writing.) ☐

(Mike Hall is a 19-year-old student at the University of Wisconsin-Madison. He is a self-taught programmer and an active participant in the CoCo-Mug, a Milwaukee users group.)

120	25	670	156
200	147	820	189
350	57	END	245
540	185		

The listing: XMASSHOW

```
5 'CHRISTMAS SHOW 1985
6 'BY MIKE HALL
7 '3019 SYLVESTER DRIVE
8 'HARTLAND, WI 53029
9 '
10 CLEAR200,&H3D00:DIM SANTA(40)
,N$(60):PLAY"V30"
19 'merry christmas logo
20 CLS0:FORX=1024+69TO1024+90:GO
SUB50:NEXT:FORX=1024+101TO1024+1
22:GOSUB50:NEXT:FORX=1024+133TO1
024+154:GOSUB50:NEXT:FORX=1024+1
65TO1024+186:GOSUB50:NEXT
30 Y=1:FORX=1024+291TO1024+317:G
```

```
OSUB50:NEXT:FORX=1024+323TO1024+
349:GOSUB50:NEXT:FORX=1024+355TO
1024+381:GOSUB50:NEXT:FORX=1024+
387TO1024+413:GOSUB50:NEXT
40 GOTO190
50 READV:IFY=1THENV=V+48
60 IFV=0ORV=48THENV=128
70 POKEX,V:RETURN
80 V=V+1:IFV/2=INT(V/2)THENVV=14
3ELSEVV=191
90 POKEX,VV:RETURN
100 'text screen data
110 DATA 142,137,0,134,141,0,142
,140,140,0,142,140,141,0,142,140
,141,0,137,0,0,134
120 DATA 138,0,140,0,133,0,139,1
31,131,0,138,0,134,0,138,0,134,0
,0,137,134,0
130 DATA 138,0,0,0,133,0,138,0,0
,0,143,143,0,0,143,143,0,0,0,133
,138,0
140 DATA 138,0,0,0,133,0,139,131
,131,0,138,0,137,0,138,0,137,0,0
,133,138,0
150 DATA 142,140,136,138,0,133,1
33,140,141,133,138,142,140,136,1
40,142,136,139,0,135,133,140,140
,138,142,140,136
160 DATA 138,0,0,139,131,135,133
,131,134,133,138,139,131,130,0,1
38,0,138,140,133,133,131,131,138
,139,131,130
170 DATA 138,0,0,142,140,141,133
,140,137,133,138,0,0,138,0,138,0
,138,0,133,133,0,0,138,0,0,138
180 DATA 139,131,130,138,0,133,1
33,0,133,133,138,131,131,138,0,1
38,0,138,0,133,133,0,0,138,131,1
31,138
190 PRINT@485,"**AND HAPPY NEW Y
EAR**";:FORX=1024TO1055:GOSUB80:
NEXT:FORX=1472TO1503:GOSUB80:NEX
T:FORX=1024TO1472STEP32:GOSUB80:
NEXT:FORX=1055TO1503STEP32:GOSUB
80:NEXT:FORX=1248TO1279:GOSUB80:
NEXT
200 'ml data for color changer
210 DATA 8E,3,FF,30,1,8C,6,0,27,
14,A6,84,81,80,25,F3,8B,10,81,80
,25,4,A7,84,20,E9,8B,80,20,F8,39
220 FORX=&H3F80 TO &H3F9E:READV$
:V=VAL("&H"+V$):POKEX,V:NEXT
230 DEFUSR1=&H3F80
240 FORX=1TO128:V=USR1(0):NEXT
250 PMODE4,1:PCLS
255 IFPEEK(188)=14THENLL=3583 EL
SELL=1535
260 FORZ=1TO15:FORL=1TO3:READR:P
OKELL+L,R:NEXTL:LL=LL+32:NEXTZ
270 GET(1,0)-(19,15),SANTA,G
280 PRINT@485,"** FROM THE RAINB
OW **";
290 'santa data
300 DATA 3,0,0,15,192,0,31,240,0
,28,248,0,24,254,0,121,255,0,124
,174,0,57,237,128,1,238,192,2,18
9,0,0,127,192,0,21,224,0,86,240,
0,85,112,0,85,0
310 'house
320 PMODE4,1:PCLS
330 LINE(0,191)-(255,191),PSET
340 LINE(100,190)-(250,125),PSET
,B
350 LINE(149,190)-(151,125),PSET
,BF
360 LINE(100,125)-(125,100),PSET
370 LINE-(150,125),PSET
380 LINE(250,125)-(225,100),PSET
390 LINE-(125,100),PSET
400 LINE(118,190)-(136,170),PSET
,B
410 CIRCLE(122,180),2
420 LINE(115,140)-(135,160),PSET
,B
430 LINE(170,140)-(190,160),PSET
,B:LINE(210,140)-(230,160),PSET,
B
```

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

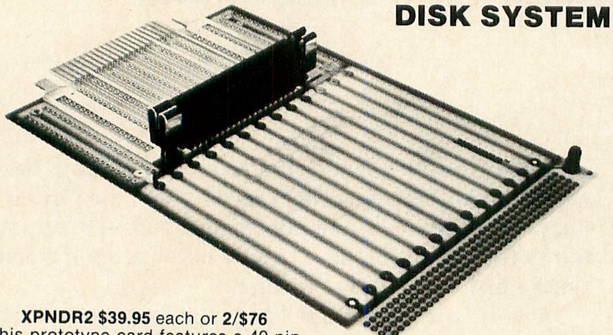
Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
Prospect, KY 40059

```
440 POKE178,2:PAINT(105,130),,1:
PAINT(165,135),,1
450 POKE178,1:PAINT(110,120),,1:
PAINT(165,120),,1
460 POKE178,3:LINE(170,115)-(195
,90),PSET,BF
470 FORX=0TO29:READN$(X):NEXT
480 FORX=0TO29:Z=USR1(0):PLAYN$(
X):Z=USR1(0):NEXT
490 'clouds
500 C1$="R5DR2DR2DR2D3R2DL2D2L2D
L5UL4UL4UL4UL4UL2UR2UR2UR4E3R2F2
"
510 C2$="R3F4D2G3LD4G3D2L2D2L3H3
UL2H2UERU3ER3U3ER2U2E2RE2"
520 C3$="R3FEFRFD4F2DGLHG2L4H2L3
UL2UL2U3E3R3ER2"
530 FORX=10TO240STEP30:Y=RND(20)
:GOSUB560:NEXT
540 FORX=13TO240STEP28:Y=RND(20)
+25:GOSUB560:NEXT
550 GOTO590
560 IFPPOINT(X+3,Y+3)=5THENY=RND
(45):GOTO560
570 DRAW"BM"+STR$(X)+","+STR$(Y)
:C=RND(3):IFC=1THENDRAWC1$ELSEIF
C=2THENDRAWC2$ELSEDRAWC3$
580 PAINT(X+3,Y+3),1,1:RETURN
590 'we wish you a merry xmas
600 DATA O3L4C,F,L8F,G,F,E,L4D,D
,D,G,L8G,A,G,F,L4E,C,C,A,L8A,B-,
A,G,L4F,D,L8C,C,L4D,G,E,L2F
610 FORX=1TO999:NEXT
620 SCREEN1,1:FORP=89TO75STEP-1:
SOUND225-P,2:PUT(174,P)-(192,89)
,SANTA,PSET:NEXT
630 HO$="D3ND3R4ND3U3BR2D6R4U6NL
4BR5":DRAW"BM200,80"+HO$+HO$+HO$
640 'deck the halls
650 DATA T2O3L4.C,O2L8B-,L4A,G,F
,G,A,F,L8G,A,B-,G,L4.A,L8G,L4F,E
,L2F
660 DATA O2L4.G,L8A,L4B-,G,L4.A,
L8B-,O3L4C,O2G,L8A,B,O3L4C,L8D,E
,L4F,E,D,L2C,L4.C,O2L8B-,L4A,G,F
,G,A,F,L8G,A,B-,G,L4.A,L8G,L4F,E
,L2F
670 Q=0:FORX=0TO50:READN$(X):NEX
T:SCREEN1,1
680 FORX=&H3D01 TO &H3D37:READA$
:A=VAL("&H"+A$):POKEX,A:NEXT
690 'tape conversions
700 IFPEEK(188)=6THENPOKE&H3D02,
6:POKE&H3D0D,14:POKE&H3D17,6:POK
E&H3D1E,14:POKE&H3D23,6:POKE&H3D
2E,14
710 DEFUSR2=&H3D01
720 FORX=0TO16:GOSUB940:NEXT:IFQ
```

XPNDR2
for the CoCo
DISK SYSTEM



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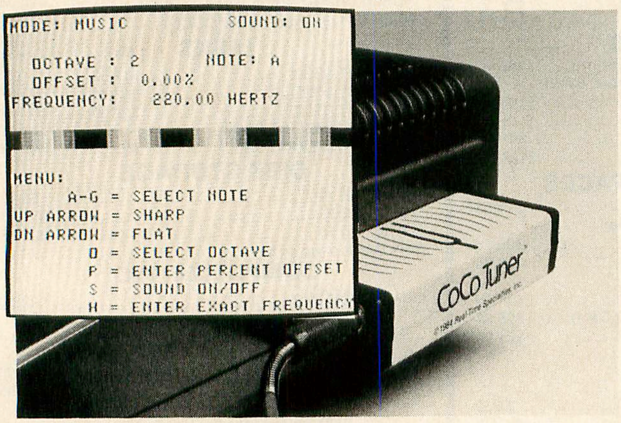

```
MODE: MUSIC            SOUND: ON

 OCTAVE : 2          NOTE: A
  OFFSET :    0.00%
FREQUENCY:     220.00 HERTZ

MENU:
        A-G = SELECT NOTE
UP ARROW = SHARP
DN ARROW = FLAT
          O = SELECT OCTAVE
          P = ENTER PERCENT OFFSET
          S = SOUND ON/OFF
          H = ENTER EXACT FREQUENCY
```

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```
=0THENQ=1:GOTO720
730 FORX=17TO50:GOSUB940:NEXT
740 'ml data for scroll routine
750 DATA 8E,E,0,10,8E,3E,0,A6,84
,A7,A0,8C,16,C0,27,5,30,88,20,20
,F2,8E,E,1,A6,80,A7,1E,8C,16,E0,
25,F7,8E,E,1F,10,8E,3E,0,A6,A0,A
7,84,8C,16,DF,27,5,30,88,20,20,F
2,39
760 'snowman
770 FORR=1TO12:CIRCLE(50,180),R:
NEXT
780 FORR=1TO9:CIRCLE(50,163),R:N
EXT
790 FORR=1TO6:CIRCLE(50,149),R:N
EXT
800 DRAW"BM50,143;C0;R3DL6UR3":D
RAW"BM50,140;C1;R3D2R3D3L12U3R3U
2R3"
810 CIRCLE(50,163),1,0:CIRCLE(50
,158),1,0:CIRCLE(50,168),1,0
820 DRAW"BM30,163;R4NG3NH3;R7BR1
8;R7NE3NF3R4"
830 CIRCLE(47,148),1,0:CIRCLE(53
,148),1,0
840 CIRCLE(50,151),4,0,.9,0,.5:P
RESET(50,150)
850 'frosty the snowman
860 DATA O2L2G,L4.E,L8F,L4G,O3L2
C,O2L8B,O3C,L4D,C,O2B,A,L2.G,L8B
,O3C,L4D,C,O2B,L8A,A,G,O3L4C,O2L
4.E,L8G,A,L4G,F,E,F,L2.G,L4D,L2.
C
870 DATA T3O2L4C,A,A,O3C,C,O2B,A
,G,E,F,A,G,F,L2.E,L4E,D,D,G,G,B,
B,O3D,L8D,O2B,O3L4D,C,O2B,A,L2G,
G
880 FORX=0TO60:READN$(X):NEXT
890 PLAY"T3":J=1:FORX=0TO28:GOSU
B940:NEXT
900 FORX=0TO26:GOSUB940:NEXT:FOR
X=29TO60:GOSUB940:NEXT:PLAY"T2":
FORX=0TO26:GOSUB940:NEXT:FORX=29
TO30:GOSUB940:NEXT:J=0
910 FORX=1TO1500:NEXT
920 PRINT@487,"AND HAPPY NEW YEA
R";:SCREEN0,1:FORX=1TO99:Z=USR1(
0):FORY=1TO66:NEXT:Z=USR1(0):NEX
T
930 RESTORE:FORX=1TO196:READR:NE
XT:GOTO210
940 F=USR2(0):U=RND(255):V=RND(1
91):PSET(U,V,1):PLAYN$(X):IFJ=1T
HENGOSUB960
950 RETURN
960 IFPPOINT(47,148)=5THENB=0ELS
EB=1
970 PSET(47,148,B):PSET(53,148,B
):RETURN
```

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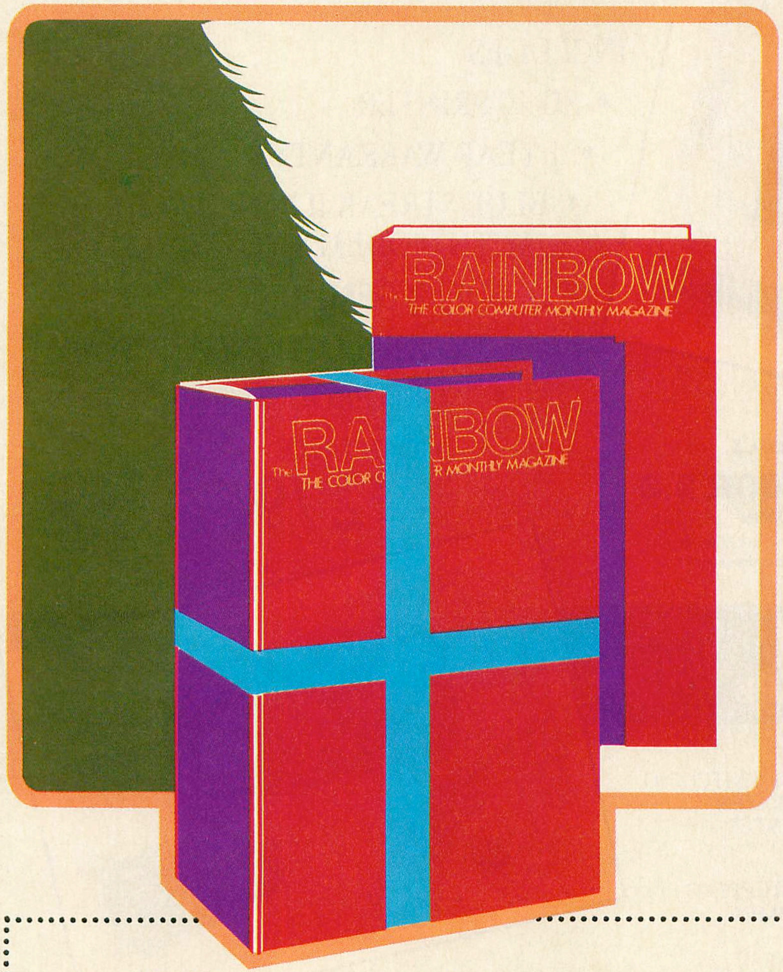
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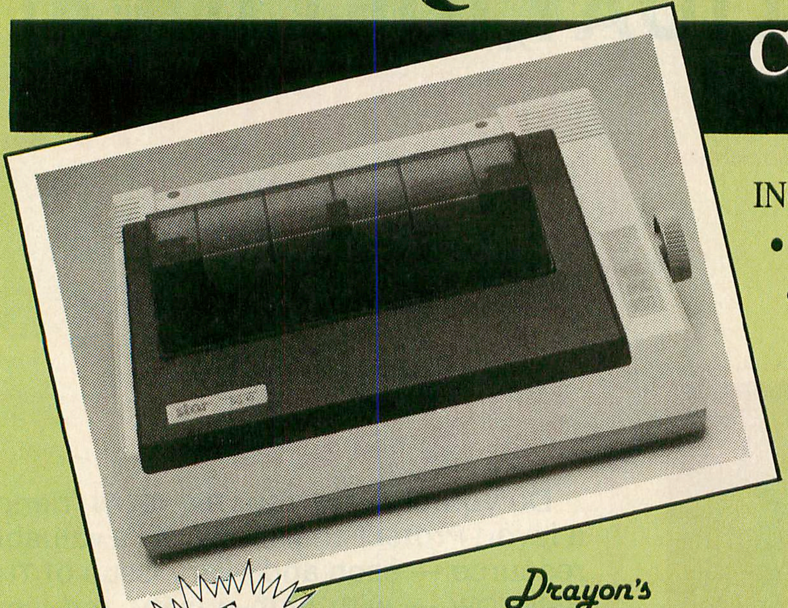

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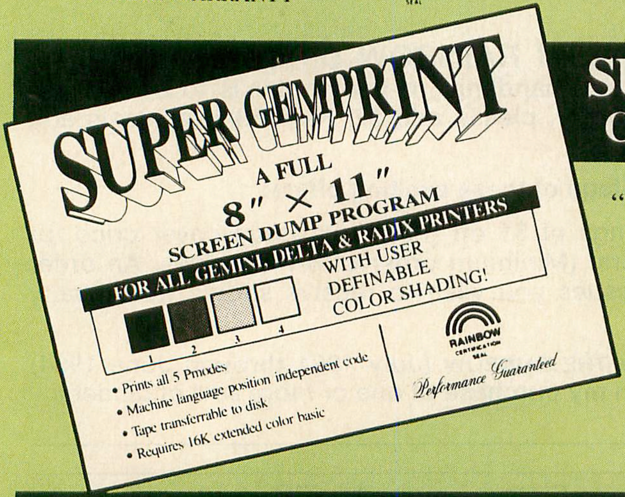

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Venture Into The Past Or Future/*Tothian Software* 243
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Fun Learning For All Ages/*MESA* 244
Young Writer's Notepad
A Simplistic Word Processor For Children/*MESA* 236

RECEIVED & CERTIFIED

The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

Micro Illustrator, a 64K graphics program requiring a joystick or mouse and a disk drive. Possible are a variety of brush strokes, assorted patterns, colors, graphs, geometric figures and fantasy designs limited only by your imagination. Text is possible anywhere on the screen. *Tandy Corp., available in Radio Shack stores nationwide, disk $29.95*

Spidercide, a 16K arcade game requiring a joystick wherein your spaceship is attacked over a planet populated by fast and deadly arachnids. Your mission is to stay alive by defeating the webs' strategy and destroying the spiders. *Tandy Corp., available in Radio Shack stores nationwide, cassette $19.95*

CD Editor, a 64K full-screen editor requiring a disk drive and residing in the space of the current `EDIT` command in Extended Color BASIC. This short (400 bytes) program allows insertion and deletion of characters and is compatible with JDOS, Disk Color BASIC and Disk Extended Color BASIC. Possible are the user's choice of re-burning the ROM for constant full-screen editing or running from the BASIC loader that comes with the disk if the user doesn't wish to re-burn the ROM. *C & D Computer Products, 1706 Seabrook Avenue, Cary, NC 27511, disk $19.95 plus $2 S/H*

Super Directory Catalog, a 32/64K organizational utility to keep track of files, sort them in alphabetical order and give a printout of the user's personal disk catalog. Possible are the storage of up to 1,700 filenames for 32K and 3,800 for 64K. *Metalsoft, P.O. Box 7796, Independence, MO 64054, disk $24.95 plus $2 S/H*

Color COMPAC, a communications utility to provide computer-to-computer access of information and/or perform data transfer operations. Requirements are 16K ECB, telephone and modem. Features include relocatable code for 32/64K CoCos, selection of Baud rate, full or half-duplex capability, selection of 7- or 8-bit word length, 1- or 2-stop bit selection and ability to transmit or receive BASIC or ML programs. *Tandy Corp., available in Radio Shack stores nationwide, cassette $29.95*

Color Essential Math Volume 1, a supplement to regular classroom instruction requiring 32K ECB for cassette systems and Disk ECB for disk systems. Skill building exercises cover addition, subtraction, multiplication, division and number concepts. Documentation includes sample record sheets for students and appendices for planning applications, making backup copies and lesson content summaries. *Tandy Corp., available in Radio Shack stores nationwide, cassette and disk $120*

VIDCODIT, a video digitizer requiring 16K for cassette systems and 32K or greater for disk systems. It is necessary to assemble the digitizer; some limited building experience and knowledge of electronics is recommended. The unassembled kit contains machine language software, a blank, pre-tinned and drilled printed circuit board, a full parts list, schematic diagram, parts layout, assembly and trouble-shooting instructions, and sample picture and image recall program (for disk version only). Possible are the selection of three, five or seven gray levels, recall of menu, image repeat or hold mode, right joystick and cassette port for signal and power, 256 horizontal by 192 vertical resolution `PMODE4` and selectable negative or positive video repeat or hold mode. *Kinney Software, Dept. 1, 121 N. Hampton Road, Donnelsville, OH 45319, $39.95 plus $2 S/H*

CoCo Cooler Too, a hardware addition for CoCo 2. Made of high impact plastic and made to fit over the vents on the outside left half of the computer case, CoCo Cooler Too pulls air through the computer to keep temperature at a safe level. *REM Industries, Inc., 9420 B Lurline Avenue, Chatsworth, CA 91311, $44.95 plus $2.50 S/H*

Stylo-Pak, OS-9 versions of three programs. *Stylo-Graph* word processing system with cursor-based editing, dynamic screen formatting, text mobility, margin and tab sets, flexible format display, text control and varied printing options; *Stylo-Merge* mail merge program with these features: append files together, possible definition and insertion of variables and printing of individual envelopes/labels; *Stylo-Spell* with a dictionary of 42,000 commonly used words and user-defined additions for a supplemental dictionary. *Stylo Software, P.O. Box 916, 482 C Street, Idaho Falls, ID 83402, three disks and manual $199.95 plus $4 S/H*

The CoCo Chronicles, a soft cover book detailing the history of the Color Computer. Included are anecdotes, a running Who's Who, dates and locations of major product and publication debuts and events, and the identity of the person who dubbed our friend "CoCo." *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $14.95 plus $3 S/H*

BASIC-PLUS, a 32/64K ECB utility requiring a disk drive to allow users to enter most-used commands with single keystrokes. Features include a 32-character, interrupt-driven, type-ahead keyboard with auto-key repeat, audio key click and 32K printer spooler. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, disk $29.95 plus $3 S/H*

CCZAP, a disk utility allowing modification of data the same way programs are modified in memory. Use of indirect addressing ensures compatibility with other Disk BASICs. Supported are up to four drives and up to 80 tracks. Possible are Hex mode entry, ASCII mode entry, writing modified sectors back onto disk, incrementing and decrementing sectors and use of *CCZAP* as a database not readily available to unauthorized persons. *Matrix Computing, P.O. Box 2011, 380 5th Avenue, Salmon Arm, British Columbia, CND., V0E 2T0, disk $49.95, U.S. funds*

Vincent Van CoCo, a 32K ECB graphics utility requiring two joysticks but capable of accepting commands from either joysticks or keyboard. Possible are four-color sets, enlargement/reduction of graphics screen, scramble/unscramble the graphics screen, text and individual scrolls. Documentation comes with quick reference card. *Rococo Software, 3019 Sylvester Drive, Hartland, WI 53029, cassette $17.95, disk $18.95*

Knock Out, a 64K boxing game that pits you as Champion of the World against five challengers; each opponent becomes harder than his predecessor to knock out. The first challenger starts punching slowly with ample time for you to react, but speed increases and reaction time decreases with each opponent. *Diecom Products, 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, cassette or disk $28.95 U.S. funds, $38.95 Canadian funds*

House Doc, a 64K home utility requiring a disk drive that asks users personal medical history questions and offers advice on when to seek a physician's care and when and how to use home resources. Documentation includes descriptions of common tests and procedures, charts of nutrients and a glossary of terms. *For Your Health Software, 58-A Star Route, Coalmont, TN 37313, disk $59.95*

Parts Per Million, a 16K or greater home utility requiring a disk drive to help horticulturists and gardeners calculate formulas for liquid fertilizers. Possible are the necessary formulas and ratios for any kind of dry, water-soluble ingredients. *Green Horizons, P.O. Box 768, Mooresville, NC 28115, disk $17.95 plus $1.50 S/H*

Puzzler, a 32K machine language game that will take any word list supplied into the built-in editor and create any of the following types of puzzles: a crossword puzzle complete with clues and small numbers to identify the words, a word search puzzle with the option of no backward or diagonal words (for the enjoyment of younger children) and a word scramble puzzle. All puzzles have an answer key that can be printed out. *Color Connection Software, 1060 Buddlea Drive, Sandy, Utah 84070, cassete or disk $29.95*

Marble Maze, a 64K maze game requiring a joystick. The object is to move your marble through the maze to a finish line while successfully avoiding monster marble eaters, acid puddles and electric snakes, among other perils. *Diecom Products, 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, cassette or disk $28.95 U.S. funds, $38.95 Canadian funds.*

DOS Switcher, a hardware accessory for J&M controllers allowing users to switch back and forth from JDOS and Disk ROMs 1.0 or 1.1, thus permitting use of software such as *Telewriter* and *CoCo Max* with the J&M Controller in place. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $24.95 plus $3 S/H*

JFD-CP Disk Controller, a new generation of the J&M disk controller. The JFD-CP uses the WD1773 controller chip. Two selectable 28-pin ROM sockets, an 8-pin parallel port and JDOS 1.2 are included. Gold contacts and fully buffered I/O lines ensure maximum reliability. Hardware selectable step rates allow a wide selection of drives. JDOS 1.2 supports auto-line numbering, error trapping, Baud rate selection, OS-9 boot and *Memory Minder. J&M Systems, Ltd., 15100-A Central SE, Albuquerque, NM 87123, drive, controller, cable and manual $289.* Memory Minder *disk $26, plus $6 S/H*

OS-9 Ramdisk Driver, for use with *Thunder RAM*, this is a RAM disk driver for OS-9 consisting of a device driver and device descriptor, which, after loading into memory, gives users, in effect, another disk drive online and enhances execution speed. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $24.95 plus $3 S/H*

ThunderDupe 2, a disk duplication program for use with *ThunderRAM* as a buffer for the master disk. Up to four disk drives can be used for duplication. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $24.95 plus $3 S/H*

Spectrum Font Generator, a printout utility requiring a disk drive and compatible with most dot-matrix printers. Users can print out any document previously saved in ASCII files with any of the five supplied fonts or create a personalized font with an included program. Font styles are Roman, Italic, Futuristic, Block and Old English. *Spectrum Projects, Inc. P.O. Box 21272, Woodhaven, NY 11421, $29.95 plus $3 S/H*

Symphony 12, a polyphonic 12-voice hardware stereo music synthesizer with four noise generators for percussion synthesis, sound effects and choice of 10 preset instruments such as violin, oboe, banjo, harpsichord, piano and chimes, among others. Possible is the connection to a home stereo system with six voices per channel or all 12 voices will sound from TV or monitor speaker. *Speech Systems, 38W 255 Deerpath Road, Batavia, IL 60510, $79.95 plus $3 S/H*

Don Pan, a 16K game requiring a joystick. You must help Don Pan, the magical flying puffer fish, stay away from danger as he flies through the air. You guide him to the balloons that contain the precious air he needs to survive and score points for yourself along the way. *Tandy Corp., available in Radio Shack stores nationwide, cartridge $19.95*

One-on-One, a 64K game requiring a disk drive and joystick. There are four levels of play in this basketball game in which users can play against human opponents or against CoCo. Level one is "Park and Rec": the referee is asleep and shots are easy to make or block; level two is "Varsity": the ref is awake and paying attention and shots and blocks take finesse; level three is "College": there are the standard settings and conscientious refs; level four is "Pro": though the 24 second clock ticks 24 times, the ticks are faster and going one on one with CoCo at this level is playing a champion on his home court. *Tandy Corp., available in Radio Shack stores nationwide, $39.95*

Panic Button, a 16K game requiring a joystick. You are in charge of an assembly line that produces robots, cakes, phones, houses, lamps and TV sets. The object is to fill the orders before time runs out to avoid getting fired. If things start piling up, push the Panic Button, instead of going into a frenzy. *Tandy Corp., available in Radio Shack stores nationwide, cartridge $19.95*

Geography USA, a 16K educational program that deals with the 48 contiguous states, the state's capital, largest city, main product and neighboring states. *Viking, Inc., 910 Soo Blvd., Rice Lake, WI 54868, cassette or disk $19.95*

The XPNDR2 and SuperGuide, a CoCo breadboard card that extends the cartridge port signals to wirewrap pins on the bottom of a 40-pin disk controller/ROM pack connector. The package consists of over 24 square inches of drilled card for interface or prototype circuits to facilitate software development or tools available for the CoCo. *Robotic Microsystems, Box 30807, Seattle, WA 98103, XPNDR2 $39.95,* SuperGuide *$3.95*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Monica Dorth

Educational Programs

BASKETBALL STATISTICS

by Jeff Stevens

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by John Ashurst

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REVIEWING REVIEWS

WORD-PAK II

Editor:

I recently purchased a *Word-Pak II* [based] on the May 1985 RAINBOW review [Page 212]. For use with prepackaged 80-column software on the CoCo, I think this product would be hard to improve. However, the software provided to link the hardware to BASIC is a weak one.

The screen editor provided is of such poor quality that I prefer not having it at all. (On my version of the software, the screen editor can be disabled by peeking the values in locations 363 and 364 prior to executing the *Word-Pak II* software, calling these values 'X' and 'Y', executing the software, then replacing the values with `POKE 363,X:POKE 364,Y`. The `CHR$` control codes will still function. Thanks to Art Flexor for the information.)

The documentation notes that the editor cannot be used for lines longer than 80 columns. The writer goes on to assure the user that such lines are not common. This is sloppy research. It also means that the editor is useless to me and most of the serious programmers I know.

While the THE RAINBOW review claims that the screen editor allows you to enter a BASIC program "in much the same manner as you use a word processor," the resemblance is poor. The screen editor is clumsy and slow compared to other editors I have used.

The obvious solution is to use the BASIC `EDIT` command to avoid the screen editor. Unfortunately, when using `EDIT`, the new cursor characteristics make it easy to completely ruin the line you are editing. Also, there are now certain combinations of keystrokes in `EDIT` that will lock up the software and require you to press Reset.

The much promoted, smooth scroll option is not satisfactory for program listings. It is either too slow or, if sped up, too choppy. Smooth scrolling only works in 80-column mode, not in the optional 32- or 64-column modes.

If for any reason you want to return to the CoCo's 32-column display you must turn off both the computer and Multi-Pak. Since exiting from *Word-Pak* to the standard display would involve simply resetting a set of addresses to the original values, I feel the omission is inexcusable.

The documentation itself contains a good deal of information, but is not well-organized. It is also less than complete for the *Word-Pak II*, having been originally written for the first *Word-Pak*.

When I sent my product registration for the *Word-Pak* back to PBJ, I included a note mentioning many of the items noted here. I have not received a reply.

Anyone interested in more details may send an SASE to me at 4715 W. Wadley, #701, 79707.

D. Dean Rector
Midland, TX

P51 MUSTANG ATTACK FLIGHT SIMULATOR

Editor:

I would like to make some comments about *P51 Mustang Attack Flight Simulator* that were not mentioned in RAINBOW's review [June 1985, Page 222]. In direct connect mode the program gives eight frames per second. By modem you get four frames per second. Extensive graphics on the ground were sacrificed in order to achieve a fast update rate that is necessary to have a good dog fight. The review describes the horizon as "a line." It does not mention that the sky is solid blue and the ground is black. This is very different than a white line drawn on a black background. The solid colors are important when doing loops and rolls to help you know when you are upside down or right side up.

The biggest reason I did not put in a rudder is because it is very difficult to hold and operate two joysticks while having a dog fight. What all the flight simulators need is two joysticks mounted on one box such as they do for remote control airplanes.

P51 is not meant to compete with standard flight simulators such as *Worlds of Flight*. *P51* is an excellent game but it should not be thought of as just a game because it is also an excellent acrobatic flight simulator. *P51* has fewer instruments and graphics but has much smoother controls. Loops, rolls, immelman turns, etc., can be performed more accurately than on any of the standard flight simulators.

Hopefully these comments will help readers know what *P51* is and what it is not.

Brian Bruderer
Author of P51

COOKBOOK

Editor:

I wholeheartedly agree with Howard Lee Ball's review of *Cookbook* [September 1985, Page 195]. It is an excellent program but needs a few patches, which I would like to share with your readers.

To the **.BAS* program add: `5 POKE 150,18` for a 2400 Baud printer.

To the *DISPLAY.BAS* program add:

```
620 IF I$="P" THEN GOSUB 2000
2000  CC=0:FOR  II=1088  TO
1439:CC=CC+1
2005 IF CC=33 THEN PRINT#-2,
CHR$(13);:CC=1
2010 FF=PEEK(II):IF FF>128 THEN
FF=239
2020 IF FF=96 THEN FF=32
2030 PRINT#-2, CHR$(FF);:NEXT
II:PRINT#-2, CHR$(13);:RETURN
```

This allows you to print the menu when it is displayed on the screen by typing `P`. The `FF=239` in Line 2010 selects the border character that I chose; you can change it to suit your taste and printer.

I suggest you make these modifications to your working copy and leave the master copy intact.

Mark Sullins
Manhattan, KS

PROBALOTO

Editor:

I wanted to write and express my appreciation for your excellent review of *Probaloto* in the October 1985 issue (Page 196). It was obvious that the reviewer took the time to work with and understand the program.

Even though the reviewer stated that his "criticisms of *Probaloto* were very minor," I would like to answer them. The weighted portion of *Probaloto* was set up to be as flexible as possible. Most of the time, *Probaloto* will be used to pick lottery numbers, but each state has different rules. States use six or seven numbers from one to 40. From one to 44, from one to 48 or other combination of numbers.

Probaloto will play these and more. The program will even sort the numbers in order if five or more numbers are being selected. In addition, an operator can use the weighted option to pick the first, or the first, second and third place horse in a race. By creating a data file that contains the published odds of each horse (20 to 1 = 20, 10 to 1 = 10, etc.), then weighting towards the least picked numbers, the operator makes a random selection weighted by the odds of the horses. If four or less numbers are selected then they will not be sorted, so he may ask for three numbers from one to, say, 11 (for first, second and third place in a race with 11 horses). There are numerous other ways *Probaloto* may be used.

The reviewer stated that the data printout was not formatted well enough, but not knowing how many numbers will be printed makes formatting difficult. The operator may be selecting from nine, 40, 48 or even 100 or more numbers. Besides, the printout from a lottery that uses numbers from one to 48 still takes less than one page. Flexibility is also the reason the program goes to the start rather than the main menu after printing or saving data files. This takes only a few seconds and forces the operator to set up the program properly. It is imperative that the operator does not play one state's lottery and then start on another state's without changing the parameters.

As far as the spelling error, well . . . I stand corrected and so does the program. If anyone who has already ordered the program is bothered by this error, I will, upon return of the original, send a corrected version and pay the postage both ways.

Thank you again for your review. Any questions concerning this program should be addressed to me at 322 Haymarket Pl., 43230.

Gary Olander
Gahanna, OH

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Magazine Index System's Flexibility Suits Many Purposes

"Now where did I read that article about a special DOS command?" How often have you asked yourself a similar question when you need to locate a specific article, program, review, `POKE`, etc., and of course you need it *right now*?

To solve this problem there is *Magazine Index System*, a specialized database program to catalog magazine articles. "Oh no," you are thinking, "another database program!" I confess being somewhat skeptical myself, but this program has so many pluses that it has a legitimate *raison d'être*.

For starters, the author has included four files (albeit with typos as noted by the author) that encompass CoCo articles published between the years 1982 to 1985. This alone makes the program very attractive to purchase. Additionally, the program has an abundance of interesting and convenient operating features.

Magazine Index System requires 16K, one disk drive and the Radio Shack disk operating system. Since the program is not copy protected, backups are easily accomplished. Being a disk database, *Magazine Index System* accesses the disk drive quite often to store and retrieve data. According to the author, data is stored in a compressed format, thereby using only 75 percent of the space of a normal file.

The nine-page manual is printed on 8½ by 11-inch paper. Since the instructions are clear and the program is totally menu-driven, *Magazine Index System* is a snap to learn.

To operate the program, simply type `RUN "INDEX"` (16K users will need to do a `PCLEAR1` first) and a colorful title screen appears. Upon pressing any key, a file menu is displayed, listing all the filenames that have the program-assigned lowercase "inx" extension. A maximum of 12 files can be on one disk. If a file is too large for one disk, additional data can be stored on other disks. Upon opening a file, the main menu is presented.

At the top of the main menu is the program's name, the filename, the number of records in the file and the number of free granules on the disk. Below this information are the six main functions of the program. Each of these also has a submenu.

"Add new data" permits entering new data in an opened file. There are two fields available for data entry. The first field is 60 characters in length and is for the article's title and a short description. The second field holds 20 characters and is recommended for the page number, the issue date and any other pertinent information. Since this field retains the data from the previous record, the page number should be listed first to facilitate easy editing of that number on additional records instead of typing in the entire field.

A nice feature of this screen (and the edit screen) is the ability to move the cursor left and right without destroying any of the data. To change a character, simply write over it; to delete a character, press BREAK. Pressing CLEAR inserts a space that can be changed to any other character. As a word of caution, if the number of characters exceeds the field's size, then the last characters in the field "fall off."

Another welcomed feature in these screens is a repeating key. Once the key is held down for one to two seconds, it will automatically repeat.

"Edit current file" displays both fields of the record in question. You can request a specific record number, edit a record, go to the next/previous record or return to the main menu. If the first or last record of a file is displayed, the previous and next record keys are inoperable.

"Search files" permits searching an opened file or all files. Up to nine separate search words or phrases (with each being up to 29 characters in length) may be used. Numerous search words require more time to complete the task, but as a speed test I used a non-word (ZXY) in one of the author's files; it searched the entire file of just under 1,000 records in about 90 seconds!

After entering the search word, you have the option of having the record displayed on the screen or on the printer. The screen display shows the record numbers being searched, the filename and the record once a match is found. You may then continue the search, print the record or end the search. If the printer option is chosen, only the record numbers and filename are shown, with all records being printed that contain the search word. A search can be terminated at any time by pressing BREAK.

"Change file" returns to the file menu and permits the opening of a different file.

"Open new file" creates a new file.

To exit the program, press the BASIC option. This closes all files, clears memory, resets the drive to Track 0 and does a cold start.

As an added benefit, the author provides an ASCII transfer program that permits files to be read by other programs. I did so using *Telewriter-64* and had no problems.

To test the program, I used the author's data as well as my own by entering all of the 1985 articles from an astronomical magazine. The program performed extremely well. Only two small problems were detected; both in the "Search files" routine. When requesting the next or previous record, the program occasionally incremented by two records instead of one. The other problem concerned searching all files: the record count was on the last file searched, not a count on all of the files.

A few routines would assist in making *Magazine Index System* a highly polished product. For example, there is no form feed command, which results in records being printed on the perforation. Also, words are cut in two on the first line if two lines are printed. A record deletion feature as well as a sort routine might also be beneficial. However, these items are not major distractions.

Even though the author has intended *Magazine Index System* to be used primarily as a magazine index, it is flexible enough for many other purposes that are only limited by the user's imagination. I really enjoyed using the program and recommend it for those who want a well-behaved database at a low price, with the added benefit of extensive CoCo article files already included.

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— Dan Smith

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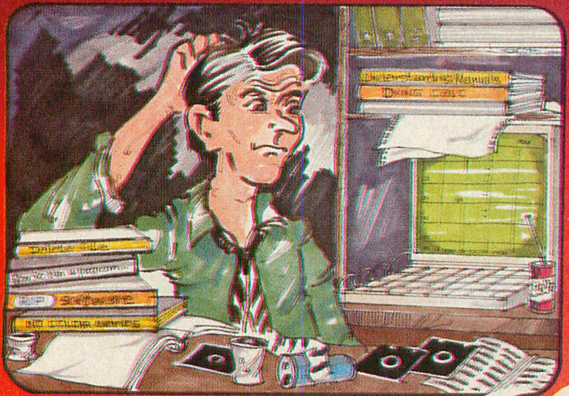

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Super Cosmos Connection Cures Slow Printer Blues

One frustration for many CoCo users is waiting for long printouts to finish. Printing a listing for a 32K program seems to take an eternity, particularly if you are waiting to run or edit it. Wouldn't it be nice if you could print one chapter of your "World's Greatest Novel" while writing the next? The Super Cosmos Connection may be just what you have been looking for.

The unit acts as a buffer between your CoCo and a printer. It is capable of receiving data from the computer at 9600 Baud (19200 if you're lucky), storing it and sending it to the printer as fast as the printer can handle it. The output from the unit is made to go into a printer's Centronics compatible parallel port. There is no serial (RS-232) output available. The manufacturer claims the unit will work with any parallel printer or they'll give you your money back. I had no problems in hooking it up to an Okidata u82A printer.

How much can it store? The Super Cosmos Connection comes in an 8K, 16K, 24K and a 32K version. The unit tested for this review was a 32K model. 32K works out to nearly seven pages of solid text at 80 characters per line and 60 lines per page. In addition, the unit can act as an RS-232 switcher by providing a modem connection.

The buffer is built into a compact plastic case that measures 4 inches wide, 7 inches deep and 1¼ inches high. There are three top-mounted switches that add a half inch to the height. Power is supplied by a small plug in an AC power-pack that comes with the unit. Two 44-inch cables come out of the back and are terminated with color coded four-pin male DIN plugs. One plug goes to the computer and the other is for a modem. The modem plug is wired for a Radio Shack Modem 1. A two-foot long ribbon cable with a 36 contact printer connector also comes out of the rear of the case.

A small, eight-page manual comes with the unit and covers the setup and operation of the unit. Unfortunately, if you have a problem with the hookup, there are no charts or diagrams to explain the signals on any of the connectors.

As mentioned before, there are three switches on top of the unit. The first is a power on/off toggle switch. With the power turned off, the modem is connected to the computer. With the power on, the modem is disconnected and the buffer is tied to the computer.

The next switch is a 10-position rotary that selects the input Baud rate. Available speeds are: 110, 150, 300, 600, 600/7 bit, 1200, 2400, 4800, 9600 and 19200 Baud. The Super Cosmos Connection's manual explains the POKEs required for the various Baud rates. The 19200 Baud setting requires the famous high speed POKE (POKE 65495,0) and may not work on all computers.

For those with BASIC 1.1 or later ROMs, setup is a matter of making sure the switch setting corresponds with the POKE information. For those with BASIC 1.0 ROMs, the setup takes one extra step because BASIC 1.0 sends seven bits of data while the unit normally expects to see eight. The buffer must be turned on with the selector set to the 600/7B position. You may then set the switch to the desired rate.

The last switch is a lighted pushbutton switch marked "copy/clear." The light indicates the unit is on, has passed an internal self-test and is ready for data from the computer. If the amount of data sent to the buffer is less than the capacity of the unit, you can make duplicate copies of your document. Pressing the button after printing has been completed produces a duplicate copy of the original. You have to be careful though; pressing the button during printer operation aborts the printing and clears the buffer.

If you turn the unit on with the button pressed, you get a printout that gives the version number of the unit, the amount of RAM installed and the Baud rate switch setting.

How well does it work? At 9600 Baud, it took the computer 20.6 seconds to print a listing for a 10K Adventure program. The printer, at 120 characters per second, took 160 seconds to finish.

I also wrote a test program to see what happened when there was more data than buffer space. The program sent the proper control codes to set the printer to 132 characters per inch (the unit had no problems with control codes) and then sent 324 full lines of a string of test characters. With the printer running, the program didn't slow down until it got to the 302nd line of printing. At that point, the buffer put in more data at the same rate it was being printed. The program finished in one minute, 39 seconds and the printing took a total of six minutes, 54 seconds.

For those who do label printing from data files, this unit could save quite a bit of time. You can search files and print at the same time. The RS-232 switching function may be a problem for some; you cannot print from the buffer and be connected to a modem at the same time because switching over to the modem kills the power.

If you do not wish to get a full 32K unit, you may buy a smaller capacity and upgrade at a later time. Upgrading is a matter of plugging more RAM ICs into the unit's sockets. A three-page instruction sheet for upgrades is available from the manufacturer. Super Cosmos Connection comes with a typical two-year limited parts and workmanship warranty. It doesn't cover accidents, abuse, unauthorized modifications or damage caused by improper user upgrades.

(Cosmos Computer Services, Inc., 620 Stuart Street, Green Bay, WI 54301, 8K $129.95, 16K $144.95, 24K $154.95, 32K $169.95, 8K upgrade RAM $15.95 each)

— Chuck Wozniak

One-Liner Contest Winner . . .

This holiday one-liner plays the traditional "Silent Night."

The listing:

```
0 FORT=1TO2:PLAY"T1L8.GL16AL8GL4
.E":NEXT:PLAY"L4O4DL8DL4.O3BL4O4
CL8CL4.O3G":FORT=1TO2:PLAY"L4AL8
AL8.O4CL16O3BL8AL8.GL16AL8GL4EP1
6":NEXT:PLAY"O4DL8DL8.FL16DL8O3B
L4.O4CL4EP16L8.CL16O3GL8EL8.GL16
FL8DL2C"
```

Fr. Tom Schmidt
St. Louis, MO

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

ChesSD Makes A Formidable Opponent

Ready for a good game of chess? Having trouble finding a worthy opponent? Thanks to Software Dynamics you can sit down to your CoCo, load *ChesSD* and enjoy a good game of chess against a competent opponent.

Like most computer chess games, *ChesSD* draws the board and displays the moves using the CoCo's Hi-Res graphics. But, unlike some other computer chess games I have seen, the graphics in *ChesSD* are excellent. All the pieces are easily and clearly recognizable.

The board is shifted slightly left on the screen and the right side is used to display the computer's move, the number of moves, a "score" based on pieces lost and taken, an estimated score that shows what the computer thinks the status will be several moves in the future, white and black clock times, and the skill level the computer is using. The space below the board is for messages from the computer and entry of moves and other commands. The game uses the standard column/row notation for entering and displaying moves. As we would expect from a good computerized chess game, it is capable of castling, *en passant* and pawn promotion.

ChesSD offers skill levels one through seven, although skill level one is an invalid entry. Default starting level, therefore, is level two. Normally the computer is black, meaning you, as white, start the game. However, if you prefer to have CoCo start, you can do so by entering "play" — this reverses the board. Play also works during the game if you want to see how *ChesSD* will play your next move.

Other features and capabilities include Tournament mode, which designates a certain number of moves within a specific amount of time and the ability to enter moves to get a previously started game back to a particular point. The game also provides the ability to set up a board to try different game situations.

What kind of player is *ChesSD*? First, let me explain that I am not a world class chess player, in fact, I'm not even a "neighborhood class" player. I fall into the class of "lunch time" players — finishing any game in less than a half hour. I personally found *ChesSD* to be unbeatable, so I called on a friend who has greater chess skills to see how he would fare against it. He also found it a difficult opponent. At this point, we wondered what would be a proper opponent for *ChesSD* and came up with an interesting idea — how about another computer?

My friend has an IBM PC (not everyone is smart enough to buy a CoCo!) and has two chess games for it, *PC-Chess* and *Sargon III*. *Sargon III* has generally been recognized as the best chess game for a PC. We set up our two systems and alternately entered the moves from one computer into the other, effectively having the computers play against each other.

I am happy to report that against *PC-Chess, ChesSD* played a good game, ultimately defeating *PC-Chess* in about 53 moves. However, when it came to playing against *Sargon III, ChesSD* met its match. With both games playing at their lowest skill levels, *Sargon* defeated *ChesSD* in about 18 moves. Does this mean *ChesSD* is not a good player? I don't think so — no more than saying that your local chess champ is not a good player if he/she is soundly defeated by a Boris Spassky or Bobby Fischer.

So far, this review has been positive, and I try to tell it like it is. So, let's go over the game's less attractive points. Although the instructions that come with the package indicate the game recognizes checkmate, I found this is not true. On two occasions the game had me in checkmate and only said "check," allowing me to move. In the same way, when it was finally placed in checkmate in the games against *Sargon*, it also did not seem to recognize it and attempted to move. Although this is not a bug that affects the play of the game, it is not the "proper" way to finish.

One other "bug" I found was during one of the games against *Sargon*, when *ChesSD* made a move that I call "super pawn takes bishop." It moved a pawn forward four (yes, four!) rows and over one column and captured a bishop. This was done when an *en passant* would have been the logical move for the pawn in question. In fairness, I must add that I made three attempts to reproduce the circumstances and each time the game moved properly, so it may have just been a bug caused by some glitch when the game loaded.

Finally, if you insist on playing to the bitter end and *ChesSD* takes your king, it does it with a "Chomp, slurp, yum!" Although the author may think this gives it a cute touch, I do not think it's "cool" for a sophisticated game like chess.

To sum it up, I definitely recommend *ChesSD* as a good, playable chess game for the CoCo.

(Computer Systems Distributors, P.O. Box 9769, Anaheim, CA 92803, $49.95)

— James G. Kriz

One-Liner Contest Winner . . .

This one-liner plays the well-known song, "Alley Cat."

The listing:

```
10 PLAY "L8O3T2V31;4;5;8;10;L4;O
4;1;O3;12;10;9;8;9;L2T2;10;L4T2;
8;9;10;11;L2T2;12;L4O4;1;O3;12;1
0;9;8;9;L2T2;10;L4T2;8;9;10;12;L
2O4T2;1":RUN
```

Danny Read
Pompano Beach, FL

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

Cash Prophet Provides Budget Forecasting

Cash Prophet, by Everyone's Computer Company, is an easy-to-use budgeting program that provides the user with both a weekly forecast and an annual budget. The program requires a minimum of 16K, Microsoft Extended BASIC and a cassette recorder. It is distributed on tape but may be easily modified for disk operation. A simple set of instructions is included to accomplish this. Including the time it takes to load the tape, it takes all of five minutes to create a disk version.

Included in the package is a 20-page, spiral-bound manual. The table of contents includes a quick reference guide to each individual menu option. The manual is written as a self-paced instruction guide and is best utilized by running *Cash Prophet* as you read the manual. Sample budget data and accounts are provided for this purpose.

The manual begins with simple definitions of some terms, such as "account," "bank account" and "transaction schedule." The term of interest here is transaction schedule. The manual defines it as "A set of information which estimates the amount of income or expense that will occur on a given day of the month throughout the year." Here is where *Cash Prophet* differs from most other budget programs I have seen. It is used to compare predicted income to predicted expenses over a 52-week period. Most programs compare a set budget with actual expenses, providing tax information as an additional side benefit. *Cash Prophet* identifies times when you may have extra cash available and more importantly, times when you will fall short of cash.

Page 2 in the manual states that you may use up to 90 accounts numbered from 10 to 99, while Page 13 states that you may use any 73 numbers from 10 to 99 for your account names. One thing is definite, however, it can only handle one checking and two savings accounts. The savings accounts must be numbered 11 and 12. Interest rates may be specified for the checking and savings accounts and the interest may be deposited into any of the three bank accounts.

Once *Cash Prophet* is loaded, modification instructions for the user with more than 16K are provided. According to the manual, this speeds up processing by more than 50 percent. After receiving the title screen and copyright notice you are prompted for a month and day. When using *Cash Prophet* for the first time, use 1023 as the month and day entry, otherwise, use the month and day of your last data file. The sample data files are identified as *CPN$1023* and *CPD$1023*. First-time users must load the sample data file and modify it to create their own customized version of *Cash Prophet*.

After loading the sample file, the main menu appears. There are eight options to choose from.

1) Transaction Schedule
2) Bank Balances, Interest Percents
3) Account Names
4) Tape/Disk Storage
5) Screen/Printer Option
6) Weekly Forecast
7) Annual Budget
8) Go To BASIC

Options 1 and 5 both have submenus. For Option 1 they are:

1) Specify Account
2) Display First Record
3) Add A New Record
4) Main Menu

and for Option 5 they are:

1) Display On Screen/Printer
2) Main Menu

Instead of simply explaining each menu option, let's walk through the steps required to build a prophecy of our own. The first records that need to be built are our bank accounts. Using Option 2, we enter our initial checking and savings account balances along with any interest information. The ENTER key is used to place the cursor in the field we wish to update, then we simply type our figures.

After this, we choose Option 3 to create our account names and assign them a number between 10 and 99. You may change an account name by using an account number that already exists and typing the new name. Delete an account by giving an account number and pressing ENTER with a blank name.

As our last step, we need to set up our transaction schedules. A transaction schedule simply sets up a dollar amount to be added or subtracted from our budget. Income is entered as a negative number while expenses are positive. A dollar amount is entered for each month. Typing an 'S' in a month copies the figure from the preceding month. The day of the month this transaction is to take place is also specified here. A day code of 77 indicates a weekly transaction, while 41 and 42 mean every other week beginning on either the first or second week of the budget year, respectively. Just to be safe, before requesting a forecast we use Option 4 to save our data.

With our data safely saved, we will now use Option 6 or 7 to request a weekly forecast or an annual budget. With Option 6, you may request a detailed forecast (one displaying every transaction processed) or just a summary providing only your bank account balances at the beginning of each week. The annual budget displays each account along with its weekly, monthly and yearly expense or income totals.

If you desire a printout, choose Option 5 and submenu Option 1 to toggle the display from the screen to the printer. This provides a forecast for 52 consecutive weeks without the option to terminate after each 13 weeks as the screen output allows.

For someone needing a forecast of their income and expenses, *Cash Prophet* will do the trick. Since the program is written in BASIC, the input/output routines are a little slow, however, the hare does not always win the race.

(Everyone's Computer Co., P.O. Box 771, Chesterfield, MO 63017, tape [convertible to disk] $39.95)

— Larry Birkenfeld

See You AT
RAINBOWfest Palo Alto
Feb. 14-16, 1986

Scepter of Ursea Is A 'Handful'

As the autumn months fade away, the mighty Thorafin Crimsonblade realizes it is time. He must once again search for an Adventure that can challenge an Adventurer's most dreaded enemy: the winter blahs. It takes an Adventure with a special quality that will keep our thrill-seeker occupied during the snows of January. Our hero's hopes looked pretty dim until a special package arrived via Dragon Express. Pulling out his mighty broadsword (letter opener), the hardy Adventurer finds himself faced with Prickly-Pear Software's latest release, *The Scepter of Ursea.*

On booting up *Scepter*, the mighty dwarf's characteristics are generated. These attributes are the basis of our character's fighting prowess, and ability to take damage in battle. These characteristics include strength, dexterity and constitution. From these values the armor class, damage adjustment and number of "hit points" are calculated. These values are the basis of the Adventurer's success (or lack of) during his Adventure.

Entering commands is an adventure in itself. The character moves on the Lo-Res screen by using one-letter commands that do standard functions such as eating, inventory and updating weapon status. If the one-letter abbreviations are forgotten, a help screen is readily available. While moving across the varied terrain, an Adventurer will encounter a host of friendly (and not-so-friendly) beings who each have their own set of abilities, strengths, weaknesses and dispositions. Sometimes the creatures attack on sight, others offer you advice (for a small fee). In my opinion (and Thorafin's, too), these creatures make the game much more interesting than some Adventures that merely state "you are being attacked by a red Warthog."

Another nice feature is the three dungeons it offers. Each dungeon contains several levels, each having its own tricks, traps and guardians. By exploring the dungeons, our hero can find potions, keys, weapons, armor, treasures and, most notably, great peril. Finding the dungeons is not easy; mastering them is even harder.

Combat with hostile encounters is handled through a random "die-rolling" method that is quite dramatic, but can get a little lengthy when large battles are going on, especially when both combatants have high armor ratings. Overall, however, this aspect is handled quite well, with a system highly reminiscent of the Dungeons & Dragons genre of games.

The wary Adventurer must keep in mind the possibility of fatigue and thus the necessity of rest and food to keep from running out of energy. Another concern is money. To really achieve any success, our hero must gather up enough money to purchase a boat. Horses and advice are always easy to gather, but they, too, have a price. The Adventurer must seek out encounters that have money and relieve them of their responsibility while still maintaining his vital organs in a working order.

The documentation is complete, although it has some minor bugs, and provides the Adventurer with the information on program operation. The game also includes (yea!) a game save/load feature, which prevents Adventures from being cut short by a need to use the word processor.

Although *Scepter* contains a few minor bugs, the staff at Prickly-Pear was very helpful and supportive, and promised to update future shipments. The Adventure on Ursea is very complete, but I think the program could be strengthened even more to make it comparable to games of this type played on (ahem!) other computers. The addition of a party of characters, each with their own identities and attributes, could add a "group involvement" to the game that it lacks right now. Also, using the remaining disk space to create a city where the Adventurer could wander would be very appealing.

I can wholeheartedly recommend *Scepter of Ursea* to anybody who enjoys Adventure/Simulation-type games. *Scepter of Ursea* takes weeks to master and provides a great deal of enjoyment.

(Prickly-Pear Software, 2640 North Conestoga Avenue, Tuscon, AZ 85749, 32K disk $29.95)

— Eric Oberle

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The RAINBOW extends Season's Greetings!

GOLDKEYS Is The Ultimate Keyboard Enhancement

Many times I have wondered how companies come up with names for their products. In the case of Vidtron, their utility is named descriptively. *GOLDKEYS* is a keyboard enhancement utility for 64K Color Computers. I have used many enhancement programs before, including complete disk operating systems, however, *GOLDKEYS* is by far the best product I have come across. Unlike many other products of this type, it does not include useless options that serve only to waste valuable memory. Instead, every option is well thought out and practical.

GOLDKEYS boots up with its own copyright and replaces the CoCo's "OK" with its own prompt. The normal cursor is also replaced by a non-destructive cursor. This means you may backspace without destroying the text already entered. This is an immediate saving of time, especially if you are at the end of a 200-character BASIC line. (A good comparison of this feature would be to a word processor.)

GOLDKEYS supports inserting and deleting characters within a line. Yes, Extended BASIC has the same options with the `EDIT` command, but only on lines already entered in BASIC. Also, it has an auto-key repeat that makes getting to the error much quicker. Of course, the auto-repeat may be toggled on and off with a BASIC command.

Another efficient feature is its function keys. They can be defined as single commands or a whole string of commands. This enables a programmer to enter several to several hundred characters with a simple keystroke. Once all function keys have been defined, they may be saved to tape or disk.

Not only does *GOLDKEYS* support function keys, it also incorporates a type-ahead feature. This is a 100-character buffer that allows you to type ahead of the computer's current operation. For example, if you type `CLOAD` the computer will start loading a program from tape. While that is being done, you can type `RUN` and when the program is through loading, it will start immediately. As with normal input, a key click is incorporated in the type-ahead feature as well. (Key click may also be toggled on and off.)

One of the most frustrating problems a programmer faces is the chance of his software being halted either by the BREAK key or the Reset button. Preventing this is where *GOLDKEYS* shines! All of its commands are added to BASIC. These include BREAKOFF, ONBREAKGOTO and ONRESETGOTO. The first obviously disables the BREAK key. The second sends the CoCo to a specified BASIC line whenever the BREAK key is pressed. The third command allows you to do what all of those game writers love to do — disable the Reset button. After using this command, whenever Reset is pushed, BASIC jumps to whatever line you wish.

The last feature of *GOLDKEYS* is certainly not its weakest. This is the INPUTUSING command. This command adds a few new dimensions to the `INPUT` found in Radio Shack BASIC. First, if the variable being used already has a value, it will be displayed in the space where the user is expected to input. Thus, the old contents of a variable or string will be displayed under the cursor and in the following spaces.

GOLDKEYS also allows a limit to be set to the number of characters that can be entered. Thus, if a date is supposed to be entered, only six characters can be typed. Also, if you wish for something in the string to remain the same regardless of what a person enters, it can be predefined as a non-destructive character. This means if someone is entering the date (i.e., 11/01/85), he will enter "11" and the cursor will automatically skip the slash and jump to the next number.

The one feature I rarely find in software packages is a graceful exit. *GOLDKEYS* has a command called UN BOOT that allows you to return to the BASIC ROM without having to press Reset or losing your BASIC program. Finally, since *GOLDKEYS* uses 64K, it takes up absolutely no BASIC memory.

Considering that *GOLDKEYS* takes no memory away from BASIC, and it adds so many features that are practical and flawless, this is one utility no serious programmer can afford to be without.

(Vidtron, 4418 E. Chapman Ave., Suite 284, Orange, CA 92669, requires 64K, tape $20, disk $22)

— Rick Rahim

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Federal Hill Software 8134 Scotts Level Rd. Baltimore, Md. 21208

Disk Pilot Uncomplicates Scroll Control

One of the things that has always exasperated me about the CoCo is the lack of scroll control. You know what I'm talking about. First type `DIR`, then take a deep breath and position your fingers over the 1) ENTER key, 2) SHIFT key and 3) '@' key. You press ENTER, then wait a second and press SHIFT and '@'. Hopefully, this does the trick and you are presented with approximately one-half the directory; if so, you may hit a key to continue. If your timing is a little off, you have to start all over.

Disk Pilot solves this problem by presenting one screen full of filenames, allowing you to move up or down the directory listing with the arrow keys, much the same way a screen editor allows you to move through text. This one feature alone makes the program worthwhile.

The *Disk Pilot* is a disk file maintenance utility with a strong accent on the user interface aspect, i.e., it is designed to link the user with the computer comfortably. In this respect it performs quite well.

The program has seven major functions:

1) Copy a file or all files
2) Kill a file
3) Rename a file
4) Get information about a file or all files
5) Print information about a file or all files
6) Run or execute a file
7) Format a disk

When you `RUN "PILOT"`, the program reads the directory of the disk inserted in the drive. If you have two drives it reads from both of them. The filenames are sorted alphabetically, and the results are displayed on a split left-right screen with Drive 0 on the left. One of the filenames is displayed in reverse video. This is the working file. Another file may be selected with the arrow keys. Once the file is selected, simply press one key to execute any of the functions.

All of the functions perform well. According to the documentation, the format option is faster than `DSKINI`. I found this to be true but only slightly — 39.98 seconds for the `DSKINI` and 38.01 seconds for the format option. There is, however, a benefit to having the format option available. If you need to copy some files and find that all your disks are new, unformatted blanks, there is no need to exit the program, use `DSKINI`, then return to copying. Instead, just press 'F'.

The documentation supplied with the program is well-written and, although brief (five pages), is more than adequate. I spent approximately five minutes reading the information and this was all the time I needed to operate the program effortlessly. *Disk Pilot* has a help screen always available by pressing the CLEAR key, which gives a summary of the options and their codes. I did find one omission in the documentation. On the help screen I found an option 'S' not explained anywhere in the literature. Being adventurous, I tried it. Lo and behold! It gave me the alternative of having Drive 0 or 1 on the left side of the screen. I trust that later printing will correct this minor omission.

Disk Pilot was supplied on a cassette that `CLOAD`ed correctly the first time and all subsequent times. Using the program this way has the advantage of immediate access to both drives, however, the `CLOAD` is so slow to those of us used to disk drives that I decided to save it on disk. It also `LOAD`ed and ran without problems this way, which is not always true with programs having embedded machine language routines. I was not able to make the program crash nor was I able to break out of it. The program is not copy protected in any way and comes with a plea from the authors to not distribute it to friends and acquaintances.

There are a few things I hoped the program would do, but it didn't. It will not create a disk file with the names of the files for use with a database management program. There is also no facility to print labels with the filenames. Further, there is no option to copy programs and change them from tokened code to ASCII. I know that's something many people need for use with communication programs.

I judge a utility program in five areas:

1) Does it really do something useful?
2) Does it do what it says it will do?
3) Is it user friendly?
4) Does it crash easily or frequently?
5) Is it a good buy for the money?

Disk Pilot rates well in all these areas. I recommend it to anyone who does not already own a similar program.

(CMD Micro Computer Services, Ltd., 10447-124 Street, Edmonton, Alberta, Canada, requires 32K, disk $14.95 plus $2 S/H)

— Larry Goldwasser

WANT A BARGAIN?
We have combined several programs from the May, June & July 1985 issues of our newsletters and are offering them as a package. Any one program would be worth the price we are asking. The package consists of the following 6 programs.
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Software Review

OS-9 Ramdisk Driver And *ThunderDupe 2* Are Super Utilities For *Thunder RAM*

I feel like the guy in the early 1900s who invested heavily in rail transportation because he felt airplanes would never fly. As soon as my review of Chris Erving's *Thunder RAM* hit the newsstands I received a package from Spectrum Projects containing a RAM disk driver for OS-9. I said it was difficult, but OS-9 guru Brian Lantz made it fly. Another utility for the *Thunder RAM* was written by Marty Goodman, *ThunderDupe 2*, a disk duplicating system that takes advantage of the TDOS RAM disk.

One thing about the review was accurate: *Thunder RAM* is gaining support extremely fast. Needless to say, to use these programs you must have *Thunder RAM* from Spectrum Projects.

Brian Lantz has written a super RAM disk driver for OS-9. It includes a device driver, "RAM," and device descriptor, "R0." After loading these two programs into memory you just type `FORMAT /R0 R "OS-9 RAMDISK"` and in about 10 seconds you have another disk drive online.

What's so great about a RAM disk using OS-9? Due to the intensive disk calls since OS-9 is a true DOS, there has been a great need to improve disk access speeds. With the *OS-9 Ramdisk Driver*, disk access is nearly instantaneous.

To point out the benefits, a procedure file named *INIT.RAMDISK* is included. This program formats the RAM disk and copies your current CMDS directory to the RAM disk "/R0." After running this program you can change the execution directory to R0 and remove your system disk. Entering a command such as MDIR will invoke an almost immediate response.

The *OS-9 Ramdisk Driver* was used with several programs, including Lantz's *Databank* and Spectrum's *OS-9 Solution*. It's like the difference between night and day as far as execution speed is concerned.

If you're anticipating mass production of disks, and can't afford a $30,000 duplicator, *ThunderDupe 2* is your salvation. By using the *Thunder RAM* as a buffer for the master disk, up to four disk drives can be used as slaves for duplication. For 35-track, 30 ms drives, each copy takes about 45 seconds, including formatting!

A configuration program is included that allows the selection of:

1) Number of tracks
2) Drive speed
3) Normal or picture disks
4) Number of slave drives
5) Optional formatting

ThunderDupe 2 was tried on several different programs and worked like a charm. After loading the master disk into the *Thunder RAM* buffer, you are prompted to insert the blank, or formatted, disks into the slave drives, depending on your configuration.

During the process of duplication the status of your copies is displayed. If an I/O Error is encountered you are notified, but the duplication process does not stop. An audible beep alerts you to the fact that all of the copies are complete. You are then given the option of whether to make more or quit.

I only had two drives, but *ThunderDupe 2* is capable of handling four drives. If you are planning to make a lot of copies, this program is for you.

Who knows what's next for *Thunder RAM*, but if the rest of the programs are as good as the first two, we can look for some interesting software in the near future.

(Spectrum Projects, P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, *ThunderDupe 2* $24.95 plus $3 S/H, *OS-9 Ramdisk Driver* $24.95 plus $3 S/H)

— Dan Downard

Hint . . .

Recovering Fast Cassette Saves

I read Mr. Bourgeois' letter in the February 1985 issue about saving programs with the speed-up `POKE`. This happened to me once and I tried several things to get the program back. Here is a method that works:

```
POKE 143,8:POKE 149,24:POKE 145,4:CLOAD
```

This will load BASIC programs saved at high speed back into the CoCo so that a normal save can be made. I hope this helps the many people who have made this (formerly) fatal error.

Ryan Devlin
Louisville, KY

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RAINBOW CERTIFICATION SEAL

EDOS 2.6 ROM Adds Useful Features To Disk BASIC

By Tom Carl

Few who have worked on other computers have not wished once in a while that our CoCo had a certain feature seen elsewhere. A Canadian firm, Micro Computer Services, has recently issued an enhanced version of Disk Extended Color BASIC 1.0, which just might have some of the features on your wish list.

EDOS 2.6 ROM is shipped on a ROM that must be installed in your disk controller. It not only offers a nice selection of new features, but also corrects some annoying bugs in Disk BASIC. Auto-line numbering, print spooling, on-error trapping and repair of the bug that causes data loss from buffers during certain file-close procedures are, in my mind, the most important elements of this new product. But this is by no means the whole story.

To use features of this new ROM, one must have a 64K Color Computer, disk drive and a controller manufactured to work on the TRS-80, such as the J&M disk controller or Radio Shack's own controller. It comes in a 24-pin version, though a 28-pin version can be specially ordered should your controller require it. The EDOS 2.6 ROM can be updated with later versions at a cost of 20 percent of the original cost to you, and you can even have it customized in certain ways, provided you file your registration card, which gives a warranty of 30 days.

The manual is well-organized and gives very adequate instructions for installing the ROM and using each of the new features. Compatibility with Disk BASIC has been kept very high by using much of the original instruction base and inserting jumps out to addresses just beyond Disk BASIC, where the new features are efficiently coded.

Programs that auto-load above $D800 in 64K RAM mode are the most likely to give you compatibility problems (*Elite*Calc* 64K version is one of these). Appendix A of the manual contains a program you can type in and store on disk that will restore EDOS 2.6 ROM back to Disk BASIC just before you start using programs that are not compatible with it. After using such a program, cold starting will bring the full EDOS 2.6 ROM back into use automatically, which is the main advantage of having DOS modifications stored in a ROM instead of on a disk that constantly has to be reloaded. This restore program can even be made a part of the incompatible program, so its use could also be transparent.

Installation is relatively easy. A small screw driver, a small amount of care and a small amount of patience are the only requirements. The controller comes apart, generally through releasing just one screw. Finding the ROM chip is no problem, and one can remove it with the small screw driver used as a pry on each end. The new chip goes in just about as easily, though be sure all legs of the chip are started in their holes before applying any pressure. The manual gives good step-by-step instructions and the necessary cautions.

When you come up with the EDOS 2.6 ROM, you are greeted with a new sign-on logo, and the OK prompt of Disk BASIC is replaced with READY. Should you experience trouble at this point, there is a phone number in back of the manual to call for help. Except in the unlikely event of erasure of the ROM in shipping and handling, there is little that can go wrong provided you use the required care in installation.

EDOS 2.6 ROM sets the number of tracks at 40 as default for DSKINI and BACKUP, sets the default Baud rate to 1200 instead of 600 and initializes an error routine that gives an audible bell tone and full explanation error printout. In addition, about a half dozen bugs in Disk BASIC are automatically repaired and four little convenience sophistications are added to I/O commands (my favorite is one that warns you during a SAVE command there is already a program on the disk by that name). The rest of the new features are invoked by the user through typing one of the new commands, which are: AUTO, COLD, DIS, DOS, DPOKE, ERROR, HIDE, MRUN, NSPL, OLD, RAM, RST, SPL, WAIT, TRACK, MOD and DPEEK.

The 40-track default can be changed back to the 35 standard through use of the TRACK command, so your old disks will read just fine. Appendix B has a program you can type in that will modify 35-track disks to 40-track without affecting the data already on the disk. All new disks you initialize with the TRACK value set at 40 will have the extra five tracks immediately.

The new HIDE command puts a copy of the disk directory on Track 37 as a guard against destroying the directory. RSTore command recovers the directory from 37 and puts it back on Track 17 should you need such help.

The DOS command operates just as the Disk BASIC 1.1 command does, except it has an extra gimmick permitting you to say DOSXX, with XX specifying the track where the DOS routines are written (normally this always defaults to Track 34, as it does with EDOS 2.6 ROM, if you specify no track). For those with 1.0 BASIC or those who have never used their DOS feature of 1.1 BASIC, you are in for a real treat because this feature puts a boot-up command processor at your disposal. Many of the annoying commands can be eliminated that normally have to be entered by hand each time you start your system. EDOS 2.6 ROM extends this beautiful idea by letting you choose any of several such command strings to bring up your system.

The SPL command converts the unused 32K of RAM into a spooler or buffer for printing. This permits release of the material being printed at a rate much faster than your printer can handle; this data is stored in the spooler until your printer can handle it. The advantage is that you can begin using the computer for other work while the spooler finishes the printing automatically. The NSPL command disables the SPL command in cases where you wish to use the extra 32K RAM for other purposes.

DPEEK and DPOKE let you see and modify two consecutive addresses in memory at the same time, which is an operation many will have little use for, but there are a number of times when this can be a big time saver for some people.

MOD (short for modulus) is a handy instruction that has been around in computer languages for a long time. It is not a necessary instruction since it can be imitated in any language with three normal instructions, but it is handy. A=MOD(X,Y) will return in 'A' an integer that is the remainder after having divided 'X' by 'Y'.

MRUN is another convenience instruction allowing you to load and run a machine language program with one instruction, as RUN does for a BASIC program.

Those who change their minds as often as I do may find the OLD command handy; it restores a program erased via NEW.

If you are going to write programs commercially, one of the real musts is an on-error command. ERROR 5000 is an EDOS 2.6 ROM command that turns on error branching so every run-time error that occurs will sound a tone, print the full error message, then branch to Line 5000 where the programmer can process the error. This is the only command I found myself wishing had been implemented differently. I prefer the system to put the error number in a variable and the line number in a variable, then pass control directly to Line 5000 for handling, so that I, the programmer, could decide on what I wanted the user to see on the screen. Through use of various peeks, EDOS 2.6 ROM lets me see what error occurs and where, so I can still accomplish some of the things I want to do in recovery, but I didn't like the idea of having the screen messages forced on me.

WAIT is another command very handy for programs destined for the commercial market. X=WAIT("ABC") works like an INKEY$ command, but it will accept as an answer only an 'A', 'B' or 'C'. Any other responses leave the user looped. If 'B' is pushed, the variable 'X' is set equal to two so the programmer can take appropriate action.

The AUTO command lets you specify where to start numbering and what increment to use, which is a better implementation than some AUTO functions I have seen. Plus the fact that all keys will repeat when you hold them down, I found this function is a very nice addition for supporting the overworked programmer.

Overall, I was impressed with the nice attention to detail and the smoothness of operation of the many enhancements. Micro Computer Services offers customizing of their EDOS 2.6 ROM chip, including adding other features, as well as fixing the sign-on logo to put your name up in lights, so you might want to ask them what it would cost to include other enhancements.

(Micro Computer Services, P.O. Box 1001, Angus, Ontario, Canada I0M 1B0, $100)

One-Liner Contest Winner . . .

This one-liner, *Circname*, takes your name (or whatever word you type) and uses it as the basis for a unique circle pattern.

The listing:

```
0 CLS:INPUT"NAME";N$:PCLS:FORT=1
TOLEN(N$):A=ASC(MID$(N$,T,1)):PM
ODE3,1:SCREEN1,1:CIRCLE(10+T*20,
96),A-31:PAINT(10+T*20,96),RND(4
),4:NEXT:EXEC44539:GOTO0
```

Fr. Tom Schmidt
St. Louis, MO

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

Young Writer's Notepad — A Simplistic Word Processor

By Kenneth D. Peters

With the kids back in school, there is one more "notepad" you might consider — *Young Writer's Notepad*, from Middletown Educational Software Association (MESA). It is a word processing program designed to be easy enough for kindergartners to learn and use, yet versatile enough for fourth graders to be creative. Network users and teachers may also use it as a flexible, creative tool in just about any area of elementary education, from spelling and writing to math. This program may even be a fun introduction to the keyboard and word processing for preschool children. It has single key selections for printing documents on an attached printer in one of three modes/styles and for typing on the screen in any one of three colors.

Young Writer's Notepad is not a sophisticated word processor like *Telewriter-64*, *VIP Writer* and others of that caliber. It wasn't meant to be! As the name implies, the program is intended to be understood and used by "young writers" in grades K-4. I think it does an admirable job in holding kids' interest and in being so readily understood. When my kids use the other word processors I have, they come running to me constantly to help them do this or that. There is too much for them to remember when using more complex word processors. *Young Writer's Notepad* is simplicity. My kids, age 6 and 8, have learned how to use it to produce notes, letters and math worksheets completely without my help.

Young Writer's Notepad is written in BASIC, so you simply type RUN "NOTEPAD" (after loading either from disk or tape) and turn on the printer. After the initial title/copyright page, the screen is cleared and a solid non-blinking red cursor appears in the upper left of the screen and you can begin typing.

Young Writer's Notepad has its own graphics characters. The characters are large and easily read by young children (three-quarters inch high and three-eighths inch wide on a 13-inch TV), and include the full upper- and lowercase set as well as the numbers and special characters on the keyboard.

Being written in BASIC and having to form its own characters, the program has a relatively slow typing capability when compared to other word processors. Still, a young writer can type approximately 20 words per minute before getting ahead of the computer and losing characters. If you can use the high speed poke on your computer, you can increase that speed to between 30 and 40 words per minute.

In the simplest case, the child can type eight lines of text containing 16 characters per line, all on the first page/screen. If he reaches the bottom right-hand of the screen, a new page appears. There are a total of 16 pages available for use on a 32K machine (approximately 2K).

You can "change pens" while typing and type in a different color by pushing the '@' key. You are given a choice of three colors, yellow, blue and red. Initially, yellow characters appear on the screen's green background. Pushing '@' the first time gives a screen containing a yellow box, a blue box and a red box. Choose a color by moving an arrow up or down to the colored box of your choice. Pushing '@' again returns to the document and characters appear on the screen in the selected color. This feature might be useful in applications such as writing, spelling or math worksheets where the problems are made up in one color and the changes or answers can be typed in another color to be easily recognized and checked. When you decide to print the text, simply push ENTER.

Pushing ENTER gives the "print" menu. Here you have four choices. There are four yellow boxes and an arrow. The arrow points to the first yellow box, which is empty, indicating that no printing is to occur. If you push ENTER the first time by mistake, pushing ENTER the second time will return to the document. The other three boxes contain black lines of varying lengths (short, medium, long) to indicate the type of printing desired. The first mode (short line) gives a print line 16 characters wide, centered on the line and in expanded/double-wide format. The text is printed exactly as it appears on the screen (what you see is what you get). The second mode (medium line) is 32 columns wide, centered and expanded, but the text is checked and adjusted to prevent splitting of words between lines. The last mode provides 64 characters wide in normal print (not expanded).

Editing of text in the simplest form consists of scrolling through the document using the four arrow keys and typing over the areas that need correction. Insert and delete functions are also available by using the SHIFT and right-arrow keys and the SHIFT and left-arrow keys. My kids usually corrected their mistakes on each page as they went along. Generally, the insert and delete capability would be used by more advanced users.

Advanced users also have additional features available. Pushing SHIFT and CLEAR brings up a special function menu where you can save and load documents on tape, save/load documents on disk (or send/receive through network, if you have this configuration), erase a document in memory, set the high speed poke (if your computer can handle it), return to the document, end the session or view online help screens. A disk index card is provided where you can keep a reference list of files/documents created on a particular disk. With the online help screens provided, you probably won't need the documentation. A help screen is provided for just about any available function with the stroke of a key, and you can return to your document at any point in the help pages.

The program was originally written for "network" users, using several CoCos tied together with a host and Radio Shack LP VIII or DMP-200 printers, and was then modified for individual home use. I did not have an opportunity to test the program under network conditions, as our school system does not use CoCos.

Aside from a couple of minor typos and one erroneous statement (which should be corrected in the near future), the excellent 15-page documentation thoroughly discusses network use and individual use. It provides a good description of all facets of the program and includes some good suggestions for applications.

The documentation says the program contains codes that are consistent with Radio Shack dot-matrix printers. This is not correct! Not all Radio Shack printers use the same codes for expanded (double-wide) characters. Therefore, if you don't have an LP VIII or DMP-200, you will probably have to substitute your printer's codes to turn expanded mode on and off in lines 960 and 1190.

In addition, most other users will have to add a line setting the Baud rate of the computer to your printer and selecting "emphasized or double-strike mode" to enhance the print quality of the document, if desired. These are easily added to the BASIC program and any other changes can be tailored to your individual needs. Printer codes and where to put them is probably the only major fault of the documentation and program. But, if there are problems you can't resolve, you are instructed to contact MESA and they will try to help. They also have a 30-day, money-back satisfaction guarantee.

I might make only one other suggestion. It is possible to erase a page in memory by pushing CLEAR while the cursor is in the "home" position (upper left of screen). It is also possible to scroll through your document and push CLEAR by accident, consequently losing your page. A prompt would be beneficial at this point to be sure you really want to delete the page.

If you are using a "network" of CoCos in your educational system, I highly recommend trying *Young Writer's Notepad*. There are many useful applications of this program in the educational environment, and young children appear to be quite comfortable using it. Outside the network environment, parents should find *Young Writer's Notepad* a good addition to the home library. My kids found *Young Writer's Notepad* easy and fun to use. I'm sure just about any young writer will find creation of his "masterpieces" just as easy and enjoyable through its use.

(MESA, Middletown High School, Valley Road, Middletown, RI 02840, 32K ECB tape $20, disk $22)

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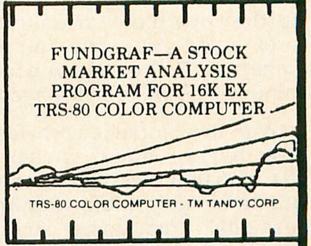

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Live The Tycoon's Lifestyle With *Corporation Plus*

I think almost everyone would like to be able to make money by playing the "market" or buying investment property or gambling on long shots at the track. Unfortunately, for most of us, these activities have a very high admission price and we can only read about such lifestyles in the "fast lane." Now, for those of us lucky enough to own a Color Computer, there is a new game available that allows us to have fun playing the role of tycoon.

Corporation Plus is a board-style game designed for fast play in the world of high finance. We are talking millions here, folks — the numbers used in the game situations have so many digits they are almost hard to read.

Corporation Plus is modeled loosely after the popular board game "Monopoly." In *Corporation Plus*, one to seven people play to become the first billionaires (or the last to go bankrupt). Like "Monopoly," you lose or gain capital from situations that occur as you move around the board. Unlike "Monopoly," you move about a color maze on the computer screen; this maze is lined with a series of colored sections (32 in all). The color of the section indicates the type of action that can take place.

The corporations that can be purchased and developed are a hospital zone, a hard luck zone, a lottery square, a city hall, etc. Because of the limitations of the Color Computer display, the color sections are not labeled and you must rely on color association to indicate the type of square on which you land.

The advantage of playing a game like this on a computer is its ability to keep track of your wealth (or lack of it) — no need to appoint a banker, sort the play money and keep track of the ownership deeds. All financial transactions are handled by CoCo and the player is prompted for various decisions (buy, sell, etc.) as the game progresses. The computer also rolls the dice and automatically moves your token. The game plays fast and is a lot of fun.

The instructions for *Corporation Plus* come on tape. They are an excellent description of the game, but they are not very convenient to refer to during play. This could, in some instances, create a problem since the game does not have a "save" feature. Another minor problem I had with the instructions is the appearance of several misspelled words. In my mind, this is almost unforgivable in a game likely to be played by children.

Both the instructions and the game are auto-loading. Because of the complexity of the game, it takes about three and a half minutes to load and requires 32K of memory. No joysticks are needed; all input comes from the keyboard.

Corporation Plus is not a true simulation of the stock market or the world of business. Almost all of the action in the game, with the exception of the decision to buy or improve a corporation, is determined by random events. But, this doesn't detract from the game. It is a fun game to play and represents a welcome variety in game software available for the Color Computer. If you are a board game fan and like to play tycoon, you may want to try this program. With the exception of the problems I mentioned about the instructions, I believe this is a very good piece of software.

(DiamondStar Software, P.O. Box 21580, St. Petersburg, FL 33742, 32K ECB, tape $24.95 plus $2.50 S/H)

— Tom Szlucha

E.T.T. Electronic Typing Teacher
by CHERRYSoft

Learning to type the right way can save you hours of tedious work when entering programs into your CoCo, and this is just what ETT was designed to do. Devote a little time every day practicing with ETT and before you know it you will be typing with confidence. Entering those programs will no longer be the chore it use to be.

ETT's video keyboard lets you practice with all the keys labeled, all the keys blank or only the "home" keys labeled. The visual cues guide you while you learn to type without watching your fingers. ETT shows your accuracy, response time, and words per minute. You will quickly see that you are improving with practice.

With the sentences provided by ETT learning to type can be fun. Over 1000 variations chosen because they include every letter in the alphabet. You can also create your own practice sets. This outstanding program was written by a certified teacher and professional programmer and comes with a ten page student manual-study guide. Requires 16K Extended Basic.

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One-Liner Contest Winner . . .

Here's a one-liner for ham radio operators and other electronics enthusiasts. This program figures the sizes and spacing of the elements of a delta loop antenna.

The listing:

```
0 CLS:PRINT"  DELTA LOOP ANTENNA
 DIMENSIONS":PRINT:INPUT"XMIT FR
EQ. IN MEGAHERTZ";F:D=(1005/F)/3
:R=(1030/F)/3:SP=(300/F)*.17:PRI
NT"DIRECTOR=":PRINTD"FT. PER SID
E":PRINT"REFLECTOR=":PRINTR"FT.
PER SIDE":PRINT"APROX. SPACING B
ETWEEN ELEMENTS="SP"FT."
```

Timothy Johnson
Tulia, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

Let CoCo Set A Party Mood With *Christmas Fantasia*

Speech Systems has come out with a delightful program for the Christmas season. *Christmas Fantasia* comes in two versions: one for disk and one for tape systems. Both require 64K and will support an optional Stereo Pak for enhanced sound reproduction.

Christmas Fantasia has 11 songs and 13 graphics screens that will help create a festive mood for any Christmas get-together. When *Christmas Fantasia* loads, you are asked to reset until the correct color appears. After that, the program is totally self-running.

As the tape or disk loads in, viewers are greeted with colorful Christmas pictures drawn in Hi-Res graphics, such as poinsettias, Frosty the Snowman, Santa Claus and Rudolph the Red-Nosed Reindeer, a band of carolers and other holiday scenes. After the picture loads, the program plays an accompanying yuletide song. *Christmas Fantasia* is an excellent program for those popular Christmas parties. Instead of just letting your little CoCo sit in the corner, give it a present by letting it show off to all of your friends.

The tape version of the program goes to the end and then needs rewinding. The disk version needs no rewinding; it simply repeats all 11 songs until you tell it to stop. If you have ever had any guests in your home say "Gee, what does that thing do?" in reference to your CoCo, invite them over for the holidays this year and show them a computer can be the "life of the party."

(Speech Systems, 38 W 255 Deerpath Rd., Batavia, IL 60510, cassette or disk $24.95)

— Jim Sewell

Hint . . .

FCC Patch for Disk *EDTASM*

I recently purchased Radio Shack's Disk Editor/Assembler package and found some of its functions to be very useful, but I miss the features Roger Schrag has added to the cartridge version of *EDTASM+*. I have added one of his changes, the "FCC print" patch, to Disk *EDTASM* as follows:

- Start up Disk *EDTASM* and enter `ZBUG`.
- Enter 'B' for binary mode.
- Type `3C04/39` and ENTER to apply the patch.
- Type `PD EDTASM+ 1600 4A7F 1600` and ENTER to save the new version to disk.

To execute the new version, run the DOS program in the usual way and specify *EDTASM+* instead of *EDTASM* on the Execute menu. This patch changes the way *EDTASM* handles the FCC instruction, so those long lists of Hex codes are no longer printed.

Glenn R. Beck, Jr.
Lebanon, PA

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All programs require a printer and a minimum of 32K and 1 disk drive but will take advantage of 64K and 2 drives. Each package features a hi-res 51 x 24 black on green screen.

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Microartist — Graphics For The Computer Artist

CoCo is a powerful computer that can do the business work, but CoCo is also fun and that means graphics. Graphics are what the *Microartist* is all about. Try a circle in your graphics screen and move it higher, lower, left or right without thinking about the syntax of those wonderful BASIC graphics commands.

The disk version comes with a non-copy-protected diskette and five pages of instructions. The diskette contained the Artist program, two utility programs (stripes and convert) and four pictures. System requirments are 32K disk or cassette and Extended BASIC with mouse or joystick. The documentation recommends the use of a mouse with this program. I used both a mouse and joystick; the mouse was easier to work with on intricate designs.

Microartist is child's play. The program is executed from disk by typing `RUN "ARTIST"`. The screen comes to life with a title page and pressing any key produces the menu screen. The menu presents 16 functions, called "modes" by the documentation: rectangle, line, ellipse, circle, rhombus, pencil, eraser, paint/texture, spray paint, zoom, get/put, view screen/print, save file, load file, erase screen and text. Move the blinking cursor to the mode you want and press the firebutton to enter that mode. To change modes, move the cursor to the upper left-hand corner of the graphics screen and press the firebutton; the menu screen will reappear.

Create a picture by selecting one of the first six modes, which produce graphic shapes (circle, line, ellipse, rhombus, rectangle and pencil). Move the cursor to the place on your drawing you want to put the shape and press the firebutton to anchor the shape, then move the mouse around to shape and size the figure. When the firebutton is released, the figure becomes a part of the graphics page.

The paint/texture, spray paint, zoom, text and get/put functions are used to add richness to your creation. The paint/texture function is the most complex function in the program. To paint, move the cursor to the part of the figure you want to paint and press the firebutton. The cursor will disappear and wait for you to enter two digits (00 to 99) from the keyboard. The paint function fills the enclosed area with one of 100 different choices. Solid colors are 00-03 and striped combinations are 05-99.

Texture is a feature that functions similar to paint except it only paints down from the cursor position. Texture produces patterns and takes three inputs from the keyboard. A wide a variety of patterns is available using texture. Texture does not paint around objects as easily as the paint function does, therefore, several tries may be necessary on a complex figure.

In the zoom mode a box about two inches square becomes the cursor and moves around the screen. When the firebutton is pressed, the area in the box is enlarged to a full screen and the cursor becomes a box one pixel in size. You can change any pixel by moving the cursor over it and pressing the '1', '2', '3' or '4' key. With this function you can repair any part of a picture.

There is a text mode for typing text on your graphics screen in four sizes. The view screen/print mode saves your creation. The documentation lists five printers that are supported: Gemini-10, Gemini-10X, Epson MX80, LP VIII and DMP-200. I used an Epson MX80 and got fine graphics prints. The printer drivers are in BASIC, and you can experiment with other printers.

There are two features that are uncomfortable to me. The get/put function has only one put for a get. I prefer a get that can have multiple puts. In trying to make a pile of rocks from a circle, multiple puts are a plus. The paint and texture choices cannot be viewed from the main program. You must run the utility stripes to view your choices and record the numbers for input into the main program. *Microartist* gives what it promises. It is not the equal of *CoCo Max*, but at one-third the price it gives a good value.

(Prickly-Pear Software, 2640 N. Conestoga Ave., Tucson, AZ 85749, tape $24.95, disk $29.95)

— John W. Robinson

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Super LOGO: A Must-Have For Child Computer Education

Super LOGO is an expanded version of Radio Shack's original *Color LOGO*. I already have *Color LOGO*, and my three grammar school kids use it at home and in school.

There are books, columns, magazines and clubs with information about LOGO. It's a graphics oriented learning language where kids of all ages easily pick up math concepts and computer logic, while "just foolin' around."

Super LOGO has been upgraded to include list processing, decimal math, interactive programming and animation possibilities. Other improvements are a more sophisticated editor, the addition of duplicate commands for syntax compatability with other variations and better disk features.

Most of what you learned in *Color LOGO* is carried over. We'll still use Break, Edit, Run and Doodle modes. Variable "turtle" shapes and multiple turtles are carried over along with all the old commands.

We still have a complete manual. It's grown to 192 printed and illustrated pages. I call it complete because everything is clearly explained step by step, with examples and lots of suggestions and tips for parents. The manual is well-organized with a table of contents, logical chapters, an index and a summary of all commands.

Let's look at the new features. List processing lets you teach the computer English words and program a response. You'll also be able to manipulate text on the screen and label your output. The manual suggests an interesting word game where words are put into a sentence at random. Nested lists are not included.

Our original LOGO lets you pass a value from a main procedure to a subroutine. *Super LOGO* allows you to send data to a subroutine for processing and return the new value. That's similar to processing allowed in higher level languages like FORTRAN and COBOL. You can write your own math functions. If this sounds complicated, there are several examples in the manual.

We still don't have a floating decimal, but *Super LOGO* does handle decimal arithmetic.

Super LOGO is now interactive. That is, it'll ask for and accept input from you at run time. It accepts input from the keyboard or joysticks.

The Editor is more sophisticated in that it now provides search and line erase features. You can also change the Baud rate of output to your printer. Speaking of printers, *Super LOGO* now provides a screen dump to your dot-graphics printer.

One of the frustrations of the original *Color LOGO* was that some published programs were in various dialects of LOGO that wouldn't work with our version without some translating. Most of those "foreign" terms have been included in *Super LOGO* so you can copy and run programs from most other versions. I checked that against programs in back copies of "Turtle News" and didn't find any programs that wouldn't work now.

Some other new commands are TRACE (like BASIC), ECHO (sends output to both screen and printer) and full graphics or text screens to eliminate those lines at the bottom of your beautiful procedures. I also checked to make sure the kids' old procedures would still run in *Super LOGO* — no problems.

The disk operation has been improved by adding a directory (it'll work on your old disks, too), partial saves and merge. You still have to go out to BASIC for other disk features.

LOGO is a must-have if there are kids around, and *Super LOGO* is, in fact, super! I assume they'll be offering the upgrade to all of us far-sighted owners of *Color LOGO* — I sure hope so; I want it!

(Tandy Corp., available in Radio Shack stores nationwide, $99.)

— Bob Dooman

Hint . . .

More about Moire Patterns

While playing with the program "Creating Moire Patterns in PMODE 4" (October 1984, Page 18), I discovered that if you change lines 90, 100 and 110 in Listing 4 to read as follows

```
90 A=A-V1
100 B=B-V2
110 X=X-V3
```

you will get a spectrum in the familiar order of red, orange, yellow, green, blue, indigo and violet.

James Darrin McDougald
Mt. Home AFB, ID

BASIC COMPILER

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64k of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 6809 microprocessor. That is why the BASIC compiler, called MLBASIC was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

- Programs can use all 64k of RAM for either program storage or for large numbers of variables and arrays like A(20000)
- Full Floating Point arithmetic expressions with functions
- SUBROUTINE and CALL commands allows for structured programming and more independent program development
- Full sequential and direct access disk files allowed
- BASIC source and M.L. output I/O to disk, tape or memory

COMMANDS SUPPORTED

```
1. I/O -Commands
     CLOSE   CLOADM  CSAVEM  DIR     DRIVE   DSKI$
     DSKO$   FIELD   FILES   GET     INPUT   KILL
     LSET    OPEN    PRINT   PUT     RSET

2. Program Control Commands
     CALL    END     EXEC    FOR     STEP    NEXT
     GOSUB   GOTO    IF      THEN    ELSE    ERROR
     ON..GO  RETURN  STOP    SUBROUTINE

3. Math Functions
     ABS     ASC     ATN     COS     CVN     EOF
     EXP     FIX     INSTR   INT     LEN     LOG
     LOC     LOF     PEEK    POINT   PPOINT  RND
     SGN     SIN     SQR     TAN     TIMER   VAL

4. String Functions
     CHR$    INKEY$  LEFT$   MID$    MKN$    RIGHT$
     STR$    STRING$

5. Graphic/Sound Commands
     COLOR   CLS     CIRCLE  DRAW    LINE    PAINT
     PCLEAR  PCLS    PLAY    PMODE   PRESET  PSET
     RESET   SCREEN  SET     SOUND

6. Other/Special Commands
     DATA    DIM     LLIST   MOTOR   POKE    READ
     REM     RESTORE RUN     TAB     VERIFY  DLD
     DST     IBSHFT  LREG    PCOPY   PMODD   PTV
     REAL    SREG    SWP     VECTD   VECTI
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Baseball Statistics Package Keeps Stats In Check

Baseball Statistics Package, by Sugar Software, is designed to keep team and player statistics for a baseball team. According to the accompanying manual, it will track little league, high school, college or softball teams. To accomplish this it maintains three different sets of statistics: team, pitcher and opponent.

The team stats are by player and contain their performance in each game by opponent. Numbers include At bats, Hits, Doubles, Triples, Home runs, Walks, Hit by pitcher, Sacrifices, Runs scored, RBIs, Steals made, Steals attempted, Strike outs and Errors. Team summary stats add Batting averages, On-base percentages, Strike-out percentages and Extra-base percentages. In addition, it gives a season total for each player.

Pitchers' stats are also by game and include Number of innings, Runs scored, Earned runs, Hits, Strike outs, Walks, Hit batters and Win-loss-save.

Opponents' stats include Total at-bats, Hits, Doubles, Triples, Home runs, Walks, Hit by pitch, Sacrifice outs, Runs, Stolen base attempts, Stolen bases made, Strike outs and Errors.

The software is menu driven and allows options to start new stats and continue adding stats for team, pitcher and opponent. There are also options to review and correct existing entries and to print out the various statistics.

In general, *Baseball Statistics Package* provides a computerized record of a team's statistics. However, most of these statistics are numbers that would be recorded by the team statistician anyway, so the question really is, "What does this program do that makes it worth buying and justifies the extra work of sitting down at my CoCo and entering all the data the statistician has already entered into the record books?" For me, it would have to provide several features that would save more work than is required to enter the data.

I teach systems analysis and programming, and some of the things I stress are that systems and programs should do all calculations (computers are good at that), they should help the user reduce errors and minimize the amount of entries a user has to make. Using these criteria, let's see how *Baseball Statistics Package* shapes up.

As far as doing calculations, *Baseball Statistics Package* calculates several averages (previously mentioned) and seasonal totals by player and team. It gets a passing grade here.

However, when it comes to reducing errors, *Baseball Statistics Package* falls a little short. It does not seem to do any edit checking on the input. I entered zero hits for a player, then said he had three triples and a home run. The program accepted it and hung on a /0 (divide by zero) error when it started printing out the stats. Since many of these entries could easily be cross-checked against each other, it would be valuable to provide that feature.

The third criterion, reducing the amount of data the user has to enter, also falls short. In entering stats, an entry must be made for every field rather than just those for which there is data. So if, for example, a player has no triples in a game the user must press '0' and ENTER, rather than just pressing ENTER to skip to the next field.

Finally, what could make this package above the rest, would be the ability to use the entries for more than one purpose. For example, why is it necessary to enter the stats for each opponent when the pitcher stats for a game are, for the most part, the same numbers that would be entered for an opponent in any given game? Why not carry over the entries for pitcher stats to the opponent stats, instead of entering them separately? It's this kind of thing that makes a program well worth buying.

To summarize, *Baseball Statistics Package* is a statistics-keeping software package that does as advertised. What does it give you that a stats book doesn't? It gives a much neater printout in several different formats and automatic calculation of all averages and totals.

(Sugar Software, 1710 N. 50th Avenue, Hollywood, FL 33021, $29.95)

— James G. Kriz

Hint . . .

DMP-105 Ribbons

The cartridge ribbon for the Tandy DMP-105 printer is apparently only available from Radio Shack. Ribbon life is rated at one-million characters, but this can easily be extended two- or three-fold.

Gently pry off the top cover of the cartridge and invert the large foam ink wheel. The constant re-inking process can be further enhanced by putting a few drops of matrix printer ink on the foam.

Melvin L. Mauck
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Software Review

Venture Into The Past Or Future With *Time Master*

Have you ever wondered on what day the first Fourth of July fell? How about how many shopping days until next Christmas? Would you like to know what your good and bad days are according to your biorhythms? Are you and your mate compatible?

Time Master tells you all of this and more. This program is written in BASIC and is made for a 16K ECB computer. With the calendar and biorhythm sections, you have the option of sending the output to the screen or to a printer. The instructions state that almost any 80-column printer will work.

The program is on cassette, so all you need to do is `CLOAD "TIMEMASTER"` and, when it is loaded, type `RUN`. The title screen comes up and you may choose one of the following six options.

1) Day of Week - Enter any date and the computer tells what day of the week that it was/is/will be.

2) Days between Dates - Enter two dates and find out how many days are between them.

3) Calendar - This prints a calendar, on screen or paper, of any months you specify. On-screen calendars are limited to one month at a time.

4) Biorhythms - This prints out a chart of your three states, physical, emotional and intellectual, on screen or printer.

5) Human Compatibility - Enter two persons' birthdates and learn their compatibility rating, based on their biorhythms.

6) Quit - End the program.

After making your selection, follow the prompts on the screen.

The first section, Day of Week, asks for the numerical month, day and year. The second section, Days between Dates, asks for the earliest month, day and year, then for the later date. You will get the number of days between those dates.

The third section, Calendar, asks if you want the output on the screen or printer. After choosing, you are asked for a month and year and the computer will show that month. If you choose a hard copy, the computer will ask how many months you want listed.

The fourth section, Biorhythms, also asks for a choice of screen or printer. Next, the program asks you to enter your birthdate and a current date. The screen changes and the computer tells how many days you have been alive and shows a chart of your biorhythms.

The fifth section, Human Compatibility, asks for two birthdates, the earliest one first. After entering both birthdates, the computer then compares them, based on how well their biorhythms match (my wife and I got 5.9 on a scale of 1 to 10). We are happily married for 12 years now with two lovely children. We must remember that biorhythms are as scientifically acceptable as astrology.

The sixth section, Quit, allows you to end the program.

All sections of the program accept years in A.D. or B.C. I tried entering a lot of different years; the highest I could go in A.D. years is 3E35, which means a '3' followed by 35 zeros. That's a long time into the future! Would you like to know what day it was on June 8, 5635 B.C.? It was a Tuesday. You can amaze your friends and really stand tall in academic circles!

When I read the instructions, they stated that *Time Master* had "numerous, useful and entertaining, calendar-related functions." I was skeptical at first, but after using the program, I was impressed. There are a couple of things I should mention, however. When you enter the date, be sure to enter the entire year. I made the mistake of entering only the last two digits and was getting the wrong days and monthly calendars. Also, if you use Function 2, be aware that the computer automatically calculates the extra day in leap years.

I recommend *Time Master* for anyone who has some extra "time" on his hands.

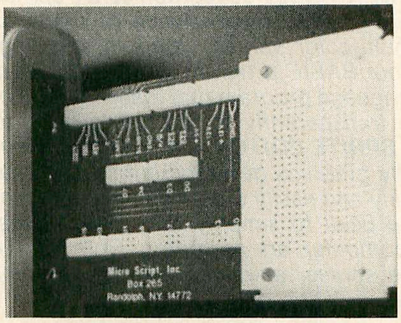
(Tothian Software, P.O. Box 663, Rimersburg, PA 16248, cassette $19.95)

— John Appel

Rainbow Gift Ideas for Happy CoCoing!

see Page 25

Use your CoCo to control devices and instruments



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Fun Learning For All Ages With *Wizard's Math Board*

This one surprised my kids, ages 13, 10 and 6; they enjoyed playing *The Wizard's Math Board* even though they *know* it is an educational program.

The Wizard's Math Board is available on either disk or cassette and runs on a 32K Color Computer with Extended BASIC. For one to four players (ages 10 through adult), it is similar to a board-type game. Movement is based on the computer's random roll of two dice. Money is awarded to each player for correctly answering a problem, with the game objective being to accumulate enough money to purchase three keys. Purchasing the three keys gives the winner the opportunity to try to solve the wizard's final riddle.

The type of mathematical problem — addition, subtraction, multiplication, division or a word problem — is determined by the square on which a player lands. In addition to the mathematical problem squares, there are also several game-related squares: the "pit" (landing here costs you $75), "lose a turn," "teleport" and '$'. Landing on the '$' square allows a player the opportunity to purchase one or more keys, depending on the amount of money earned.

To accommodate players of different ages and skill levels, a menu allows each player to select an appropriate level of difficulty. At the lowest level, problems use only the digits 1 through 9, the second level uses digits 1 through 20, the third level uses digits between 10 and 50, and the fourth (most difficult) level uses digits between 99 and 999. The menu also allows each player to select one of four bonus levels. The first level awards a player a $5 bonus if he answers the problem within 30 seconds; the fourth level awards a $20 bonus for answering the problem within five seconds. (The second and third levels give intermediate bonuses.)

This software arrived (disk version) packaged safely within an attractive, five-page instruction booklet. The instructions are well-written and very complete. Included at the back of the booklet is a Program Evaluation Form, pre-addressed for mailing to the authors.

Every detail of this package, program and manual, is carefully executed. The four difficulty levels allow children to play along with adults, each competing at an appropriate level. Word problems as well as the numerical problems are generated using random numbers (within the selected difficulty range).

The game board is attractive. Each player's move is shown first on dice, then on the board. The correct answer is displayed for problems answered incorrectly. Scores (money accumulated) are displayed for each player.

The manual is well-done — easily read, complete and neatly packaged. (And being a technical writer by profession, I tend to be extremely critical of written documentation.) I was very impressed with this program, with respect to both form (program execution) and content (educational value).

Also included is a price list (with order blank) of the 12 educational programs produced by the Middletown Educational Software Association (MESA). Prices are given for both disk and cassette versions, and additional charges are itemized for networking rights and the license to make copies. Other programs teach keyboard skills (grade three through adult); music composition (grade four through adult); handling money (grades two through nine); counting skills (preschool and kindergarten); letter and shape matching (preschool and kindergarten); addition and subtraction (grades one through six); and word processing.

(Middletown Educational Software Association, Middletown High School, 114 Valley Road, Middletown, RI 02840, cassette $20, disk $22 plus $2.50 S/H)

— Jerry Oefelein

SPRITE GRAPHICS

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Sharpen Gambling Strategies With *Blackjack Dealer* And *Feeler Dealer*

If you are planning to go by Las Vegas on your next vacation, Saguaro Software has a program you need before you go. There are actually two programs in the package, *Blackjack Dealer* and *Feeler Dealer*. *Blackjack Dealer* lets you play against CoCo, the computerized house, without the chance of losing any real money. *Feeler Dealer* lets you test a gambling strategy you have devised.

In *Blackjack Dealer*, the house rules are those commonly used by most gambling casinos. The house will stand on 17 and must hit on 16. If a tie or "push" occurs, the bets are canceled. In some casinos the house wins all ties. The house will pay three to two on a blackjack. This means if you bet $10, you will win $15 if you get 21 on the first two cards.

The manual with the package is quite good. It explains the different house rules and which ones are in effect in this version of "Blackjack." It also explains some of the rules that different casinos use and why you should not play with these rules. The manual suggests the different strategies you should use for the different house rules and what to do when different numbers of card decks are used. If you have your own method, it can be tested out with *Feeler Dealer*.

Feeler Dealer allows testing of different strategies and you can go through hands very quickly. First, pick the number of hands you want played. You are given the options to have the results of each hand go to the screen, printer or just have the computer play each hand using your strategy, then display how you fared at the end of all the hands. At that time, you again have the option to have it printed out, start over with a new strategy or run it again using the same one.

You enter your strategy from a series of menus of the most commonly used strategies. Therefore, you can mix and match to the different ones. If your method uses some really special features, the program allows you to go inside the program to enter different betting strategies, how and when to split pairs and different strategies on when to take a hit. The program is designed to be very versatile.

One of the things *Blackjack Dealer* shows very quickly is how easy it is to lose money. The "dealer" or "house" has the advantage most of the time. This package tries to teach you when the dealer does not have the advantage, thus giving you a better chance of winning. Now nothing can guarantee winning, but knowing how the game is played and when it is advantageous to make larger bets could possibly make a big difference in your pocketbook.

I am not much of a gambler, but I really had fun with *Blackjack Dealer* and *Feeler Dealer*. There is a lot of thinking behind this simple-looking game. It is not all luck, as few things really are. Mainly, these programs helped me learn to slow my losses down some. I guess if it can do that in just a short time, with a little more practice, maybe I could actually start breaking even, or who knows, maybe I could win!

But seriously folks, I did have a lot of fun with this package and I learned a lot more about the game of "Blackjack" than I knew before. If you are interested in really learning how to play "Blackjack," I recommend this package. It makes you aware of when the odds are with you and when they are against you. I recommend playing *Blackjack Dealer* before reading the manual on the different strategies, then compare your previous winnings to playing the game after you study the instructions. If you just like playing and do not want to lose any money, then I can still recommend this package — just remember to play it on the computer and stay away from the casinos. *Blackjack Dealer* and *Feeler Dealer* require 32K Extended Color BASIC and are available on both disk and cassette.

(Saguaro Software, P.O. Box 1864, Telluride, CO 81435, cassette $24.95, disk $29.95 plus $1 S/H)

— Dale Shell

CANADIAN PAYROLL

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Play War Games With *City War*

"Let's play global thermonuclear war," was the premise in the movie *War Games* and now Prickly-Pear Software is offering *City War*, which is a scenario of that premise.

The game has the United States and the Soviet Union as the combatants in a nuclear exchange. The objective is to obliterate the population of an enemy city where their president or premier is located; this, then, ends the game.

City War is designed to be played by two or more players. The program requires 16K and is available on either tape or disk. I received a tape version that loaded in 75 seconds and ran with no problem at all. The program only has one copy on tape (but is not copy protected) and is easily tranferred to disk.

The instruction manual is eight pages of 5½ by 8½-inch sheets. The commands for the game are shown in Table 1.

There are also commands for saving and loading a game in progress since a game may take several hours to play.

Upon running the game, the title page displays the program's name, a mushroom cloud graphic, the authors and the distributor. Upon pressing any key, you are prompted to enter the access code for the U.S.A. and then your opponent is requested to do the same for the U.S.S.R.

The next screen displays the cities of each country, their total populations, and their total missile inventory. Each country has eight cities with 'X' number of offensive and defensive missiles in them. Play commences in the year 1960

Table 1

Key	Usable In Peacetime	Usable In Wartime	Uses Turn	Access Code	Explanation
A	Yes	Yes	Yes	Yes	Arms missiles
B	Yes	No	Yes	Yes	Increases each missile in a city by one or a specified missile by two
C	Yes	No	No	Yes	Changes your access code
H	Yes	No	No	Yes	Reveals the location of your leader
I	Yes	No	Yes	Yes	Reveals whether your opponent is armed or unarmed but is only effective 50 percent of the time
L	No	Yes	Yes	Yes	Places you in wartime status and launches a specified number of missiles from a city to an enemy city
M	Yes	No	No	Yes	Moves your leader to a specified city
P	No	Yes	Yes	No	Requests peace with your opponent
R	Yes	No	No	Yes	The opposite of 'B' but can be an unlimited number not exceeding the city's inventory
S	Yes	No	No	Yes	Status of cities including their populations, missile inventory and arming status
U	Yes	Yes	Yes	Yes	The opposite of 'A'
Y	Yes	Yes	No	No	The year being played

SOFTWARE

Color Computer MACHINE MONITOR - professional software and manuals published by R.C.I.
EDIT memory Content, TRACE program Instructions, TRAP data References, 3 display Formats.
Program distribution includes both [2K] CoCo-dependent and [4K] stand-alone Versions.
#10101/Tape = $14.45, #10102/Disk = $16.95; User Guide #20101/Small manual = $9.95

HARDWARE

Color Computer PCBoards, FR4, [4x8]", 40 Pin, gold plated Connectors, design by R.C.I.
#30101/A Bus Extender, cartridge Slot width (4.25"), 40 parallel signal Lines = $14.00
#30102/A Prototype "P", [3.5X6]" grid, .042" PTH, .1" spacing, 34 pin Connector = $20.00
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and each turn takes "one year," except for nuclear exchanges, which are in real time.

During peacetime, it is beneficial to increase your arsenal since numerous offensive missiles are needed to eliminate a city and defensive missiles are required to knock out offensive missiles.

Once you are engaged in warfare, the offensive player chooses the number of missiles to be launched, the launch site and the target. The defensive player can launch defensive missiles to intercept the incoming missiles. However, defensive missiles are only effective half of the time and they can only destroy an equal number of offensive missiles. If you choose not to defend, your losses are potentially much higher but you have the opportunity for immediate retaliation.

Once the incoming missiles detonate, the monitor screen flashes and then displays a body count. If a city's population is totally obliterated and your head-of-state is there, the game ends. If your head-of-state is not there, the game continues but the destroyed city is no longer usable.

While playing the game, there are some random variations. For example, a militant group may overtake a missile silo and launch missiles toward an enemy site. Also, as the years pass, the populations increase, making it more difficult to eliminate them. Additionally, during wartime, missiles may malfunction and not render any effect.

While I played the game, I found some illogical moves as well as a few irritants.

First, the 'A' or armed code is usable even though the missiles are already armed. As mentioned above, this code uses a turn. Likewise, the 'U' or unarmed code is usable even though the missiles are unarmed and this also uses a turn.

Second, if you accidentally enter anything other than a number in the launch menu, you are asked to redo the input when the message repeats itself; upon doing this, a second request overwrites a portion of the first request. Also in the launch menu, if you do not have any offensive missiles remaining, the program goes into an endless loop wanting to know which city is the launch site. If this happens, you have to BREAK the program.

Third, I see no use for the access code unless it is to make the game appear more realistic. I feel it is a time waster.

Also, since you have to destroy the city where the head-of-state is located in order to win, there appears to be no use for the 'R' (reduce missile inventory) command. And, if you accidentally try to defend a city with no defensive missiles (which is easy to do), you use a turn.

Lastly, there are misspellings in the text, and abbreviations are used for some cities in the main menu even though there is ample room to spell them out. Some of these items may seem like nitpicking, but the game would play better and appear more polished if these changes were made. Fortunately, some changes are easily implemented by the user.

Overall, I give the game a five out of a possible 10. It would be interesting to some, but failed to hold my interest.

(Prickly-Pear Software, 2640 N. Conestoga Ave., Tucson, AZ 85749, tape $24.95, disk $29.95)

— Dan Smith

Software Review

Spectrum Font Generator Gives CoCo More Versatility

This recent offering from Spectrum Projects incorporates some interesting and powerful features. First, it allows the user to print out letters, documents or most anything else from previously saved disk ASCII files. This means you can simply use your favorite word processor program to create a letter or other printed text. Then, after saving it as an ASCII file, send it to your dot-matrix printer in any one of the five supplied fonts.

Secondly, if you would like to create your own personalized font or edit any of the five supplied, the software incorporates a program that provides a grid on which you specify just how you want each character to look. Obviously, this is a slow process, but nonetheless possible, and even challenging!

Most dot-matrix printers are compatible with this program. Specific character sets are included on the disk for use with most Radio Shack, Epson, Gemini and Okidata printers. I should point out that the resultant printed text is larger than the normal text output to these printers. Of the five fonts supplied, Roman is the smallest at $\frac{1}{8}$ inch high. The other four fonts, Old English, Futuristic, Block and Italic, all measured $\frac{3}{16}$ inch high.

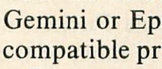
Since the printed text is larger, it's much easier to read than the normal text output from my Gemini-10X printer. I printed out a letter using the Italics font from my *Telewriter-64* disk and it reminded me of the print style and size in my old family Bible. Because of the larger printing, the instructions recommend selecting 60 characters per line with the *Telewriter-64* format menu if you're using either Gemini or Epson printers. If you're using one of the other compatible printers, 30 characters per line is recommended.

It's not necessary to use this software only with a word processor. You can simply load in the font of your choice and `LLIST` or `PRINT#-2` will result in some very interesting program listings.

The *Spectrum Font Generator* only works on disk systems. The package consists of the diskette and a two-page instruction sheet. The disk is not copy protected, so backup copies for your own use are no problem. I was impressed with this program. It offers a variety of uses and provides even more versatility for our favorite computer. I recommend it highly.

(Spectrum Projects, Inc., P.O.Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, $29.95 plus $3 S/H)

— Jerry Semones



Happy Holidays
To The CoCo Community
From The RAINBOW

The Complete Rainbow Guide to OS-9 Thoroughly Covers Every Aspect Of OS-9

By George Dorner

Where was this book when I needed it? I needed it the first day I got OS-9, I needed it last fall, and I needed it last week. I will need it again, and I am delighted to have it next to my CoCo and other OS-9 systems. It will stay there for a long time, except for the excursions to my bedside, to the hammock or to other leisure-reading locales. I plan to order a couple of copies for use at the college where I work — where OS-9 is used regularly by faculty and students.

The chief rap against OS-9 has been the lack of printed aids, such as this one. Many have criticized the OS-9 documentation from Tandy (it was a great improvement over the originals from Microware), but those manuals are reference documents. *The Complete Rainbow Guide to OS-9* is the supplement one needs to really get a handle on just what OS-9 is and what it is good for.

I have been fond of referring to the difficulties of learning OS-9 as a "shallow learning curve." Dale Puckett and Peter Dibble have been on the curve a long time and have a wealth of varied computer experience between them. They have distilled their experiences onto the pages of this book for us all. In fact, there is enough in Chapter 16 to justify the cost of the book to those who have spent hours reconfiguring a new system or changing the stepping rate on their drives.

Who are these knowledgeable authors? Dale Puckett is well-known to readers of this magazine and to most of the 68XX community for his articles and programs in a variety of media. He is also the president of the OS-9 Users Group. Peter Dibble is a columnist for *'68 Micro Journal* where his "OS-9 User Notes," appears monthly. Peter has taught programming and has worked in the instructional use of computers at a university. He returned to graduate school about a year ago to pursue a Ph.D. in computer science and is the vice-president of the OS-9 Users Group.

Let me give my unbiased opinion: This is an excellent and useful book. It has something for everyone who wants or needs to know about OS-9, the sophisticated UNIX-like operation system, which became available for the Color Computer almost two years ago. Those who bought OS-9 because it just seemed to be the next thing to do with their CoCos, professionals who use UNIX at work and who want to compare OS-9, and even those from the SS-50 buss crew who have had OS-9 for a couple more years will all be able to study it with profit or dip into it for pleasure. The book's accompanying diskettes enhance both the learning and the pleasure.

Falsoft did a dandy job of production on the book and diskettes. The book is attractive in soft cover, and its 420-some pages, 32 chapters, seven "Workshops" and other parts are laid out well, have wide margins for making notations, and make use of a cartoon character to highlight the themes and break the monotony of the printed page. They reproduced actual program listings and output rather than resetting into type, thus avoiding the errors that always accompany such attempts to make the listings look better.

Roughly the first half of the book will be useful to the OS-9 neophyte; the bulk of the material is tailored to the CoCo OS-9 environment. The second half is for programmers who want to "work within the system" or for the technically curious who want to know what is going on behind the scenes. Surprising to me is the amount of Level II OS-9 material here. It is well-known that Tandy has licensed Level II and there is a Level II CoCo somewhere in the making, but for most CoCo folk, this material only serves at this point as extra study material ("honors work") or as a presentiment of things to come.

The presence of Level II material makes the book genuinely useful to the entire OS-9 community. At this moment I am typing on a CoCo sitting next to a terminal that is hooked into a system running OS-9/68K on a 68008, and in the next room is my Apple II with a 6809 board, which can also run OS-9. Dale and Peter's book can help me in many ways on all three systems and on the six-terminal Level II system at work.

Occasionally, there are terms mentioned (like the module named ACIA or the ESCAPE key) that may be mysterious to CoCo users, and likewise there may be "phasing errors" (what is CCIO?) in some of the text for non-CoCo readers. But I laud and commend the authors and publishers for giving us a book that not only targets the audience THE RAINBOW obviously wants to hit, but that will be useful to so many more, as well. I will mention some of the high points of the book, then, in order to maintain the pose as a real critic, I'll criticize a few things.

I liked the idea of starting the book with an overview: "The Historical Connection." Most new users of OS-9 who can't understand what all the shouting is about have very little experience with any other "real" operating system. What comes on a CoCo or Atari or Apple and is integrated with Microsoft BASIC hardly gives an adequate reference point for the subtleties and power of OS-9. Users familiar with CP/M or just about any mainframe operating system know or quickly come to appreciate the rationale and the nuances of how OS-9 lets you control the computer.

The first review of OS-9 I ever saw referred to OS-9 as "a finely tuned Ferrari." If you've been driving a '68 Ford Fairlane, you might be in awe of a Ferrari the first time you get behind the wheel. The initial historical approach, a discussion of hardware and a look at memory are a good start at laying down "a foundation that will let you build a staple of OS-9 programming skills with ease."

There are a couple of chapters that serve as a thumbnail sketch or overview for what is to be covered in detail in the rest of the book. It is hard to present a simple linear description of OS-9, even when you know your audience has the necessary background. This material helps, but readers should not be concerned if every detail isn't understood on first reading. Some of this discussion assumes the reader has experience as an assembly language programmer.

The rest of "Part I" covers the essential topics related to the file system under OS-9. This includes directories, pathlists, anonymous directories, working directories and standard I/O paths. A picture of the directory tree structure would have been helpful here. Also, the cartoon character could have been worked in to fix in the reader's mind this important concept and its relation to the data and execution directories.

"Part II" is the actual tour guide, a walk-through of the use of the system from the initial boot. This is the user's manual, which might save hours for new users, especially Color Computer users, for whom this part is very much tailored. The only thing I have to criticize here is the light coverage of what is called the "Repeat Key," the Control A/Clear A function that is so useful and seems to be unique to OS-9. I hoped the authors would write the definitive work on this little function, which OS-9ers "in the know" have been talking about, but nobody has yet written.

"Part III" continues the tour through the command set, those utilities that reside in the CMDS directory on the distribution disk of OS-9. I liked the classification of the command set into those that give information, those that work on files, those that work with directories, those that are used to create or copy disks, and those that change the system. The last two chapters of this section cover Shell commands and procedure files, and by this time the reader should realize the power and enormous flexibility of the OS-9 system.

The gears are shifted for "Part IV," where various toolkits, which make an OS-9 user's life easier, are presented, use of the assembler is covered and the BASIC09, C and PASCAL languages are discussed. Six of the popular packages of tools, filters and other programs are reviewed in detail. There is a discussion of the various approaches toward overcoming the disk format and screen shortcomings that Tandy presented with OS-9.

It is always a help to see working programs in the language you are studying, and there are a number of excellent assembly language programs and fragments. Several of the fragments have typos that prevent them from working. These are mostly in the spelling of the system calls, though some formatting was disturbed when the typesetter transferred the listings to nice bold print. There are, however, some useful programs written by a computer science student from the University of Iowa, Tim Harris.

The program examples for BASIC09 are each presented twice, once in "normal" BASIC and once in BASIC09. Studying how a familiar program may be restructured and simplified gives the best type of tutorial in this powerful PASCAL-like extension of the most popular hobbyist computer language. There are also some listings of very useful utility commands written in BASIC09. The fact that these could be made to look like other commands by packing them and using *RunB* did not receive any attention here. This point seems to have been missed in the book.

There are eight listings of programs written in C. These are from Tim Harris and from William H. Ball of Indianapolis. The rest of the material on C is terse, but study of these well-documented and useful programs will help those who are starting off with this powerful and enigmatic language. Only a cursory discussion of PASCAL09 is given, since the language was not available for the CoCo when the book was written.

At this point, we are on Page 232. A beginning OS-9er should probably put down the book for a while and gain some familiarity with OS-9 before proceeding. The rest of the book is intended for real hackers in the old sense and for those with a computer science background or who wish to peer into the innards of OS-9. Not only the thrust, but the writing style changes here. This is Peter's part of the book and his style is less folksy than Dale's. While such differences in style are apparent throughout the book, I feel they are appropriate. The expert who will get the most from the latter half of the book needs less space devoted to the handholding that is designed into the earlier part of the book.

"Part V" covers the details and some of the philosophy of OS-9 operation. The use of memory, the management of disk space and the details of the various modules that reside in memory are discussed. Device descriptors and drivers and the various managers in the system are discussed as they are in no other source and as could only be done by someone who knows about several other operating systems. There is also a chapter on disk formats and a comparison between the standard format and the one that Tandy produced because of their investment in disk duplication machines.

"Part VI" continues with a more detailed look at modules and memory management. The last two chapters are devoted to memory management in a Level II system. If you haven't seen a Level II system work, be assured that just about all the memory constraints and thus, the other shortcomings of Level I on the CoCo, go away in that setting. We can hope we will see it on an upgraded CoCo soon.

In an appendix there are diagrammatic memory maps of both Level I and Level II systems. These could have used more explanation in text, but they are invaluable to inveterate hackers.

That wraps up the review of the traditional part of the book, and *The Complete Rainbow Guide to OS-9* would indeed be complete if it stopped there. But there is a really nice bonus just near the end of the book in the form of seven "Workshops." A Workshop is a significant program or two with a very brief discussion, all presented with the intent that inquisitive people will want to study good, non-trivial,

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proven programs for style, techniques and tricks. These are good programs — all of them are very interesting.

There are two programs in Workshop I, *The Cookie Monster* and *The Daemon. Cookie* is a program that "takes over your system" by demanding "I want a cookie" until you offer it one. The utility of the program is nil, but the techniques used in the assembler listing to avoid exit from this program by the usual methods are interesting and applicable in other programs you may write. Incidentally, be sure you have the lowercase enabled before you run this program, for the Cookie Monster doesn't like COOKIEs.

The Daemon is a more interesting and a much more useful program. This "guardian spirit" lives in your system and runs programs every so often according to instructions you have previously given. The program sleeps for 10 seconds, wakes up, checks its duty list, does the work and goes back to sleep. This program and the one in Workshop 2, a *Notepad*, which stores short messages in memory without going to the disk, use "data modules." These are modules that have been dummied up to be loadable into memory (OS-9 *only* will load valid memory modules), but with storage space allocated for use by a program. Peter wrote several columns about this concept, and these two programs give you an opportunity to see them at work.

Workshops 3 and 4 contain useful programs to conveniently read files at the terminal, to change priorities of programs that are executing, or to absorb the output of a process and letting it disappear. Again, these are both useful and worthy of close study.

The last three workshops are simply assembler listings for OS-9 device drivers, pieces of code that will be written by very few hobbyists, but are excellent examples of how to tap the system resources. I won't say more about them, but this is the first time I recall seeing anything like them in print in wide distribution or for this price. (You may, if you wish, buy copies of source code directly from Microware.)

You only retain what is learned from a book like this if you put it into practice. Unless you like copying long programs and searching for typos, you should also buy the two diskettes that are available from Falsoft. They contain the listings and the executable code for just about all the programs in the book. There are a few "bonus programs" thrown in as well, and these are useful utilities in assembler or C. The package includes a booklet listing all the programs. I counted over 50 BASIC09, assembler and C source files, and executable code is included for all those you desire. There are also good instructions on how to use the diskettes to the best advantage. These diskettes make it possible to "test out" a program or an idea illustrated by a program in the book without the delay of doing the data entry and worrying about your typing skills getting in the way.

That's the package! With *The Complete Rainbow Guide to OS-9* at hand, you, too, can conquer OS-9 . . . at whatever level you wish. With the diskettes at hand, you will be able to concentrate on using and understanding excellent examples of programming on the most sophisticated operating system available for small machines.

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TURN OF THE SCREW

A helpful list of some computer acronyms and abbreviations

What Is A VDG, Anyway?

By Tony DiStefano
Rainbow Contributing Editor

I wrote an article on how to add a video output to the CoCo in the May 1984 issue of RAINBOW. To this very day, I still get letters about it; I decided to take a moment and answer the most common questions. The single most-asked question is "Where (or what) is a VDG?"

All the chips in the Color Computer have part numbers that identify them. While numbers are good for ordering and sorting, they say very little about what the chip does. The makers of these chips have given names to them that describe their respective functions. For instance, the heart of the CoCo is a microprocessing unit designed and manufactured by Motorola. Motorola gave this part the code number of MC6809. For technicians who are very familiar with chip numbers, it is no problem to remember that a MC6809 is a microprocessing unit.

There are so many different chips made by different companies (which do basically the same thing) that numbers no longer have a clear meaning. Especially when talking about computers in general and not about one specific model. People started calling chips with a specific function by nicknames. A MicroProcessing Unit soon came to be known as an "MPU." This is known as an *acronym*. An acronym is a word formed from the first letter or group of letters of a series of words. There are a lot of abbreviations and acronyms in computer jargon. Some of them are directly related to the CoCo and some are not.

I have compiled a list of all the abbreviations and acronyms for computer parts I could think of. The ones marked with an asterisk (*) mean that the CoCo has one of them inside or uses it in one of its add-ons, such as a disk drive. Along with the acronyms is a full name and short description. Not all of the acronyms represent one chip — some may represent a group of chips and some represent a type of standard. I am open to letters for the ones I may have missed and will write an update as soon as I can.

> ***"There are so many different chips made by different companies (which do basically the same thing) that numbers no longer have a clear meaning."***

(Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.)

Acronyms and Abbreviations

ACIA (*used in the Deluxe RS-232 Pak) — Asynchronous Communications Interface Adapter. Used for serial data.

A/D — Analog-to-Digital. A chip that converts an analog voltage to a digital value.

ALU — Arithmetic Logic Unit. Used to perform binary arithmetic functions.

ANSI — American National Standards Institute.

ASCII — American Standard Code for Information Interchange. Better known as ASCII characters. The format is such that all alphanumeric and special characters on a typical computer keyboard are given a specific numeric value. Anyone using the ASCII standard will use the same values.

BASIC (The language, as in Color BASIC 1.1) — Beginners' All-purpose Symbolic Instruction Code. (Bet you didn't know that one, ay?)

BCD — Binary Coded Decimal.

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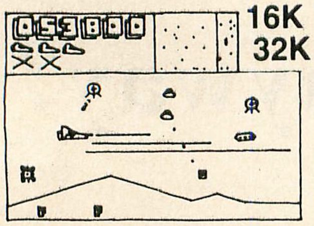

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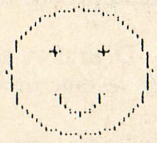

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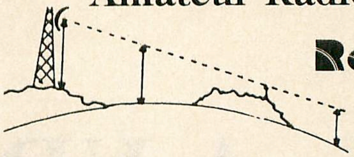

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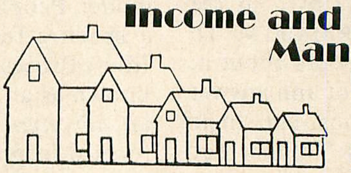

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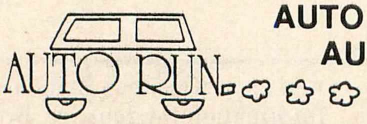

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Radio Shack: LP7, LP8, DMP100, 110, 120, 200, 420, 510, 2100
Okidata: 92A - unless it is version 4. The ROM has a bug and the dealer should replace it for you.
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Prowriter: 8510

These type styles come on the CoCo Calligrapher program tape or disk:

Old English
Gay Nineties
Cartoon

Tape - $24.95
Disk - $29.95
Both require 32K ECB

These additional type styles are also available — **$19.95 each, or $49.95** for all on tape or disk.

Tape 1

Old English-reduced	Cartoon-reduced	Gay Nineties-reduced
Old English-reverse	Cartoon-reverse	Gay Nineties-reverse
Old English-reverse/reduced	Cartoon-reverse/reduced	Gay Nineties-reverse/reduced

Old English Cartoon Gay Nineties

Tape 2	Tape 3
Broadway	Business
Broadway	Business
Broadway	Business
Broadway-reduced	Business-reduced
Broadway-reverse	Business-reverse
Broadway-reverse/reduced	Business-reverse/reduced
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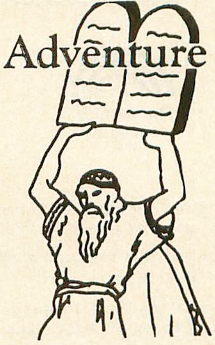

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CPU (*the CoCo uses an MC6809) — Central Processing Unit. Basically the same as MPU described earlier.

CRT — Cathode-Ray Tube.

CRTC — Cathode-Ray Tube Controller. A chip used when an 80 by 24 character display is needed. Sometimes referred to as a CRT.

CTM (*the CoCo uses an MC1372) — Color Television Modulator. It takes the signals from the VDG and converts them into a signal that is suitable for a color TV.

D/A — Digital to Analog. A chip that converts a digital value to an analog voltage.

DMA — Direct Memory Access. A process of moving data from one device or memory area to another device or memory area without the use of the CPU.

EIA — Electronic Industries Association. An agency that sets standards.

FDC (*the older Radio Shack disk controller uses the WD 1793 by Western Digital and the newer Radio Shack uses the WD 1773 by the same company) — Floppy Disk Controller. This is the main chip used when a computer talks to a floppy disk.

EEPROM — Electrically Erasable, Programmable, Read-Only Memory. It is the same as an EPROM except that electricity rather than ultraviolet light is used to erase it.

EPROM — Erasable, Programmable, Read-Only Memory. More permanent than RAM but less than ROM.

IC — Integrated Circuits. It means all chip-like components.

IIA — (*the CoCo 'F' board and the CoCo 2 use an MC6822) — Industrial Interface Adapter. It is much like a PIA but has slightly different input capabilities. Used in conjunction with the newer keyboards.

LCD — Liquid-Crystal Display. Usually seen on a digital watch.

LED — Light Emitting Diode. The indicator on almost any disk drive.

LSI — Large Scale Integration. Many transistors in one package.

MMU — Memory Management Unit. Something that is lacking in our CoCo, this chip lets a CPU handle more memory than it could without it.

MSI — Medium-Scale Integration. Smaller than the LSI.

MSO — Montreal Symphony Orchestra. Has nothing to do with computers, but it is something we are proud of in Canada.

OP-AMP (the CoCo uses the old standards LM741 and LM339) — OPerational AMPlifier. Used in audio circuits to amplify a given signal.

PIA (*there are two of these in the CoCo, they are both MC6821s) — Peripheral Interface Adapter. Lets the computer "talk" to things like a keyboard or joysticks.

PIC — Priority Interrupt Controller. This chip is useful when a computer has many levels of interrupt.

PLL — Phase Locked Loop. This is a device that compares the phase of one signal with another.

PROM — Programmable, Read-Only Memory. Like an EPROM but not erasable.

RAM — Random-Access Memory. Usually pertains to any kind of memory but mostly refers to static memory, as opposed to dynamic memory.

ROM (*the regular CoCo has one of these. If you have Extended BASIC, it is another one. If you have Disk Extended BASIC, there are a total of three ROMs in your CoCo. The newest CoCo 2 has BASIC and Extended BASIC ROMs

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bundled together) — Read-Only Memory. It is called "read-only" because the information is inserted into the chip at the factory and cannot ever be changed. This process is called a "masked" ROM.

SALT (*only the CoCo 2s have this custom chip) — Supply And Level Translator. In the CoCo this chip is responsible for main voltage supply regulation, RS-232 interface level conversion, cassette read operations and driving the cassette relay.

SASE — Self-Addressed, Stamped Envelope (see the last paragraph).

SAM (*the CoCo has one of these — an MC6883) — Synchronous Address Multiplexer. This chip takes care of the DRAM ROM and I/O in the CoCo.

SSI — Small-Scale Integration. Even smaller than MSI.

TTL (*there are a few of these in the CoCo) — Transistor-Transistor Logic. Actually TTL refers to a whole family of chips that do everything from simple buffering to AND and NOR gates to full memory refreshing. There are many levels of TTL, ranging from the regular to the 'S' (Schottky) series and the LS (Low-power Schottky) series. Today there are even more. There is the ALS (Advanced Low-power Schottky) series, the AS (Advanced Schottky) series and even the 'F' for fast series. There is even a HC (High-speed CMOS) series. All have different specifications for speed, power dissipation and price.

UART — Universal Asynchronous Receiver/Transmitter.

VDG (*the CoCo and CoCo 2 use the MC6847) — Finally, the one we have been waiting for! It stands for Video Display Generator. It is the chip that translates memory data into the visual display with which we are most familiar.

VLSI — Very Large Scale Integration. Refers to chips that have thousands and thousands of transistors, something like the Motorola MC68000, a 16-bit CPU that is used in the . . . sorry I just can't say it, red-fruit like computer.

There are also a lot more chips and components that go into making up the CoCo, but the rest do not have fancy abbreviated names. The following is a list of the active components in the CoCo that are not mentioned in the list of acronyms.

The MC14050B is a latch used in the D/A circuit.

The UM1285-8 is a Modulator. It takes the signal provided by the CTM and converts it into a signal that can be used by a regular home TV.

The MC14529 is a data separator used to select the analog inputs for the A/D circuit. These are the joysticks, sound, cassette and exterior sound. In fact, all of the analog-type signals that are in the CoCo go through this chip.

The CoCo also has four voltage regulators. The regulated voltages are +12 volts, -12 volts, +5 volts and -5 volts. The CoCo 2, on the other hand, has only two regulated voltages: +5 volts for all the circuits and an internal (to the SALT chip) -5 volts.

Through the years the CoCo has evolved from the first board (which I believe to be the 'B' board) to the latest CoCo 2. As a point of interest the next list is the amount of components it takes to build a CoCo 'F' board and a CoCo 2 'A' suffix board:

	CoCo 'F'	**CoCo 2 'A'**
Capacitors	85	49
Connectors	7	6
Crystals	1	1
Diodes	17	13
ICs	29	16
Fuses	1	1
Inductors	10	7
Relays	1	1
Resistors	83	34
Switches	3	3
Transformers	1	1
Transistors	4	2
Misc. components	89	43

Though I do not have the exact numbers, the CoCo 'B' board has even more parts than the CoCo 'F' board and the CoCo 2 'B' board is supposed to have even less parts than the CoCo 2 'A' board. How is that for progress? And don't forget the price difference, too.

Next time someone talks to you about his VDGs and DMAs, you will be able to understand what he is talking about, and tell him what we have in our own CoCo.

As always, if you have a problem with something in this column and absolutely can't wait for the mail, give me a call on Monday nights *only*, at (514) 473-4910. My address is 4680 18th Street, Laval Ouest, Quebec H7R 2P9. If you write to me and expect an answer, include an SASE; you won't get an answer without one. I am sure you know what SASE means, right? □

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Getting The Most From 256K RAM Chips

By Dan Downard
Rainbow Technical Editor

• *Lately I have seen 256K RAM chips (41256) advertised in several different electronics magazines. Will these chips work in the Color Computer? If they do, how would you access the memory above 32K? Also, how fast do the chips need to be?*

Is the VDG chip in CoCo capable of being used with an RGB interface? Do you know of anyone working on that idea? What is the usual makeup of an RGB interface circuit (block diagram)? Do you know where I could get any additional information on the VDG chip or RGB theory?

Steve Tolley
Theodore, AL

The 256K chips have to be rated for 150 ns, Steve. You will also need some kind of interface hardware and software, such as *Thunder RAM*, to address the different memory banks.

I recommend writing Motorola to obtain information on the 6847 VDG in your CoCo. I recently saw an ad for an RGB converter for your CoCo video, but have yet to see one in operation.

The RGB system of video has individual red, blue, green and sync outputs to the monitor. The 6847 is not capable of generating the proper signals for RGB and it is a major project to undertake. Good luck, and if you get it working, write us and we'll publish it.

(Dan Downard is an electrical engineer and has been involved in electronics for 25 years through ham radio [K4KWT]. His interest in computers began about six years ago and he has built several 68XX systems.)

DOS Double (Sided) Bind

• *I have just recently purchased a double-sided disk drive from Software Support, Inc. It has a J&M disk controller, but I requested Disk BASIC. The disk drive does not operate right. It loads programs, but I cannot save, format or do anything that has to do with changing the disk.*

I contacted Software Support's technical staff. They told me I needed JDOS and a DOS switcher. I wasn't too sure about JDOS so I bought ADOS. Yes, you guessed it, ADOS didn't help either. How do I get my disk drive to work?

Jaysen Kingery
Pacifica, CA

Jaysen, I suggest you read "Getting On the Right Track" by Colin Stearman in the July 1985 issue of THE RAINBOW (Page 26). Double-sided drives require special connections to take advantage of the extra storage space.

I think your problem is hardware, not software, related. At the same time, Disk BASIC will not support double-sided drives without a patch as described in the above mentioned article. You can always use them as single-sided drives.

Upgrade Uncertainty

• *Ever since purchasing a 16K Color Computer, I have been looking for the correct way to upgrade my system to 64K. I have my own 4164 RAM chips to use, but I'm not very certain on how the upgrade is performed. I have the newer CoCo 2 that uses the conventional dynamic RAMs and these chips are situated in two rows (one with three chips, the other with five). The memory chips and the addresser are socketed, while the rest are soldered directly to the board, but I'm not sure what PC board I have.*

When I upgraded my old 'E' revision CoCo, I had to connect TP1 and TP2 with jumper wire. Would I have to do this in the case of my CoCo 2? And what would be needed to connect the 64K socket printed on the PC board?

Loren Dickey
Tucson, AZ

Loren, the hardware gurus at Spectrum Projects recently sent me a sheet with upgrade guidelines for your computer. According to them, besides replacing your memory chips, you have to solder a wire between two pads labeled "J1." These pads are located between resistors R7 and R27 on the lower right-hand side of your circuit board.

Joystick Combo

• *I own a Color Computer with ECB and 64K. I have this problem with the Radio Shack white joystick. I know they sell adapters for the CoCo so you can use an Atari joystick. Instead of buying this adapter, I thought I could just cut the plugs off of the Radio Shack and Atari joysticks and put them both together.*

I examined them by removing the outside covering to see which wire went to the direction of the joystick. I did this and had some success, but on the Radio Shack joystick there are some wires that go to more than one direction of the movement of the joystick. What one or more of the wires would go to the Atari joystick?

Johnny Harris
Newport Beach, CA

There is a wiring diagram for the CoCo joysticks in the *Color Computer Technical Manual* (Radio Shack Cat. No. 26-3193), Johnny. CoCo joysticks use a potentiometer for an analog output to the computer. Atari joysticks are just switches controlled by a lever. If you look in the ads in THE RAINBOW, a few companies make adapters for using Atari joysticks with the CoCo, but I don't see any way to use CoCo joysticks with an Atari.

Graphics Garbage

• *The Radio Shack Disk System Manual states that if* `DSKI$ 0, 17, 2, A$, B$` *ENTER and* `PRINT A$;B$` *ENTER is used, the contents of Track 17, Sector 2 will be printed to the screen. All I get is graphics garbage. Sector 2 contains the file allocation table and I'd like to see it in English. The* PEEK *routine, for the file allocation table on Page 51 in* 500 Pokes, Peeks 'N Execs *gives me the same garbage.*

When I use some of the lower sector numbers (3-7) I get a resemblance of the directory, but there are still some graphics characters between the program listings. Also, I have to `CLEAR 300` *before I ENTER the* `DSKI$` *listing to avoid an OS Error. According to the manual, no* `CLEAR` *command is necessary.*

I have a CoCo 2 64K Extended and single Slim Line Drive with a 1.1. ROM. Is there something wrong with my computer or controller?

Jose Garcia
Mooresville, NC

There's not a thing wrong with your computer, but if you think it speaks English, wait till you hear this.

When BASIC is intialized, there are only 200 bytes reserved for string space, Jose. Since each sector has 256 bytes, a `CLEAR 300` gives a few more extra bytes than you need, but it's only memory.

The garbage you're seeing on the screen is non-ASCII codes, or graphics representations of hexadecimal numbers greater than 128. You can convert these characters to numbers by using the BASIC function `ASC`. Try the following program:

```
 5 CLEAR 300
10 DSKI$ 0,17,2,A$
20 FOR X=1 TO 68
30 PRINT HEX$(ASC(MID$,X,1));
40 NEXT X
```

We'll have you speaking hexadecimal in no time at all.

Preserving Pages

• *I am interested in making a graphics Adventure that uses disk space to store pages. Is there any way I could save* Micropainter *files to disk and* `LOADM` *them to my game?*

Also, what building is that always pictured on the "RainbowTech" page? Just thought I'd ask!

Dale Atwater
Cherryfield, ME

As far as your first question Dale, sure, you can `LOADM` any *Micropainter* file as a command from an Adventure game, as long as you first use the proper `SCREEN` and `PMODE` commands to put your CoCo into the proper graphics mode.

The second answer escaped all of the expertise of our editorial department. We would like to think of it as "Rainbow Tech," but after extensive research, and a little help from Jerry McKiernan, our assistant art director, we discovered it is Highland Middle School in Louisville, Ky.

Printing the Picture

• *I am in the market for a graphics program. My search took me to Radio Shack, where a program called* Disk Graphics *was recommended. This appears to be a fine program and certainly does the things I want it to do, with one exception: I cannot print it using my Star Gemini SG-10 printer. It seems that it can only be printed by a Radio Shack printer.*

My question is: Do you know of a disk graphics program, similar to that of the Radio Shack program, that can be printed on an SG-10? This program generates bar graphics, both horizontal and vertical, pie charts, line charts and dot graphs. It also has calculation functions for averaging purposes, enhanced printing sizes and automatic lining.

If you do not know of such a program, do you know of any way that the Radio Shack Disk Graphics *program can be printed on my SG-10? I would not mind procuring another piece of software such as a screen dump utility, provided it is a reliable, no-hassle method that is friendly to use.*

John E. Walsh
Danvers, MA

We have found the SG-10 to be very popular, John, and feel there are others with the same question. One program that comes to mind, which will allow you to compose and print graphics pictures, is *Graphicom*. Most other graphics programs require a customized screen dump routine for your printer. You may experiment with *Hardcopy* by Computize; even though the SG-10 is not listed in their literature, I think it is compatible with Epson printers.

I think your best bet will be to find a graphics editor you like, such as *Disk Graphics*, and just use a screen dump program such as *CoCo Screen Dump* by Spectrum Projects.

Piggyback Replacement

• *I have an 'E' board 16K Color Computer that was upgraded to 32K by the "piggyback" method. However, I seem to have a problem with some software due to this upgrade. For example,* Color Disk Scripsit*'s graphics mode will not work. All that is seen is a screen of "garbage interference." Also, this problem occurs in other graphics-type displays with other programs.*

My questions are, is there any way to get around these problems through any POKE*s and/or* PEEK*s, and is it difficult to replace the "piggyback" upgrade to a legitimate 64K (or is it not worth the effort since 99 percent of most programs work fine)? Will Radio Shack perform the 64K upgrade since the machine was not upgraded originally by them? Do any of the advertisers in* RAINBOW *perform this type of upgrade?*

D.A. Turowski
Natrona Heights, PA

I have seen 64K RAMs as cheap as $15 for a set of eight. At that price, I think you would be wise to replace your piggybacked RAM chips as soon as possible. Your problems will disappear.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

LEARNING OS-9

Adding more features to the LIST command

The Utility Room

By Brian A. Lantz

Welcome back to the "Utility Room"! Step over that hammer, and have a seat on that sawhorse.

If you missed the last issue, you missed my explanation of the LIST command, along with the changes required in order to allow the LIST command to receive its input from the standard input path, as well as from specified files.

I will try not to repeat information from one installment to another, so if you missed the last one, try to get a back issue. All line numbers mentioned in this article are in reference to the listing in the last issue.

This time we will add more features to the LIST command. We'll give LIST the ability to print only a specified range of lines, instead of printing out the entire file. OK! Get out your reference book on assembly language programming, the last issue of RAINBOW along with this issue and let's get started.

Let Me 'Count' the Ways

In order to print only selected lines within a file, we need to first show the computer how to count. A computer, by itself, is really a dumb machine. We need to "teach" it everything. So, how do you teach a computer to count? Let me show you.

In order to keep track of the current line number, let's set aside a place in data memory for the command to use for the current line count. Add a Line 155 to the listing that contains:

```
COUNT      RMB  2      line counter
```

Now, let's initialize it to zero. A simple way to do this is to make Register D (registers A and B combined) equal to zero and store it at COUNT. Add these lines between lines 250 and 255 of the listing (Line 255 was added in the last issue):

```
CLRA            set register A equal to 0
CLRB            set register B equal to 0
STD   COUNT     store 0 at the 2 bytes of COUNT
```

Well, we set aside our scratch pad. Next, let's add the assembly code that counts the lines as they are read. In between lines 350 and 360, add the following:

```
LDD   COUNT      get the current line count
ADDD #1          add 1 to the line count
STD   COUNT      store the new line count
```

Your Choice of Options

We are now ready to determine how we want to be able to give our choice of range options to the LIST utility command. With BASIC's `LIST` command, a range can be specified with any one of the following:

```
line1-          from "line1" to the end
line1-line2     from "line1" to "line2"
-line2          from the beginning to "line2"
line1           "line1" only
```

We will do basically the same thing, except we will require our option list to begin with either a plus sign or a minus sign. This makes it easier to check and see if there are any range options on a command line (we simply check for a '–' or a '+'). Therefore, our equivalent ranges are:

```
line1-          from "line1" to the end
line1-line2     from "line1" to "line2"
-line2          from the beginning to "line2"
line1           "line1" only
```

Before we design the assembly code, let's set up a small chart of syntax rules that we must handle within our code in order to reach our destination.

Rule #1 — Any number following a '+' (if present) is used as

(Brian Lantz lives in Tampa, Fla., and is president of the National OS-9 Users Group. He is a free-lance programmer, with programs carried by Tandy, Computerware and Frank Hogg Labs. He has developed much of the commercial OS-9 software released in the last year.)

Table 1

```
OPTCHK    LDA  ,X+        get next character
          CMPA #',        check for a comma
          BEQ  OPTCHK     if it is, skip it
          CMPA #$20       check for a space
          BEQ  OPTCHK     if it is, skip it
          CMPA #'+        check for a "+"
          BEQ  PLUS       if it is, branch
```

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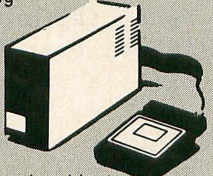

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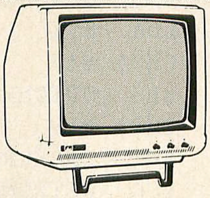

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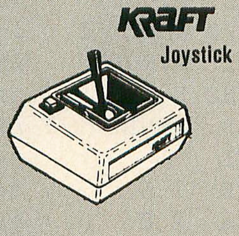

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the first number of the range.

Rule #2 — If Rule #1 applies and the number is not followed by a '–', then the last number of the range is the same as the first number. (This allows single line printouts.)

Rule #3 — Any number following a '–' (if present) is used as the last number of the range.

Rule #4 — If the first number of the range is not specified, then the first number of the range is the first line of the input.

Rule #5 — If the last number of the range is not specified, then the last number of the range is the last line of the file.

Rule #6 — The range list (if present) must be terminated by either a CR or a delimiter (space or comma).

With these rules in mind, our next task is to write the routine to check for ranges and analyze them. Insert the lines from Table 1 into the listing between the current lines 500 and 510.

Now for an explanation of what these new lines do. The first line gets the character pointed at by 'X'. The next four lines skip past the delimiters (commas and spaces). The next four lines check for the '+' and '–' characters. If the character in Register A is not one of these, the branch is made to OPTOUT and it is assumed this character is the first character in a pathname.

'T' Minus One and Counting

If the character is a '–' then the MINUS routine is processed. This routine checks to see if the next character is a digit. If it is not a digit and it is a character greater than '9', it is sent to PARERR. This is to satisfy Rule #6. If the next character is greater than '9' it is not a number and it is not a delimiter.

If the character is less than '0' it is sent back to OPTCHK, since it may be a delimiter or a CR. This allows for Rule #2 and Rule #5. If the '–' is followed by a delimiter, the last number is assumed to be the end of the file.

The next task of the MINUS routine is to convert the ASCII decimal number

Table 1 (continued

```
         CMPA #'-        check for a "-"
         BNE  OPTOUT     if not, end OPTCHK
MINUS    LDA  0,X        get next character
         CMPA #'0        test low number range
         BLO  OPTCHK     if less, branch
         CMPA #'9        test high number range
         BHI  PARERR     if too high, error
         BSR  GETNUM     convert the number
         STD  TO         store "line2" at TO
         LDA  0,X        get next character
         CMPA #$20       is it a space?
         BEQ  OPTCHK     if so, branch back
         CMPA #',        is it a comma ??
         BEQ  OPTCHK     if so, branch back
         CMPA  #$0D      is it the end of line?
         BEQ  OPTCHK     if so, branch back
         BRA  PARERR     else, a parameter error

PLUS     BSR  GETNUM     convert the number
         STD  FROM       store "line1" at FROM
         LDA  0,X        get next character
         CMPA #'-        is it a "-"?
         BEQ  OPTCHK     if so, branch back
         CMPA #',        is it a delimiter?
         BHI  PARERR     if not, parameter error
         LDD  FROM       get "line1"'s value
         STD  TO         store as "line2"
         BRA  OPTCHK     branch back

OPTOUT   LEAX -1,X       set X back one char.
         RTS             return from routine
```

Table 2

```
GETNUM   CLRA            set A equal to 0
         CLRB            set B equal to 0
         BSR  ONCE       check for 1 digit
         BSR  TWICE      check for 2 digits
TWICE    BSR  ONCE       check for 1 digit
ONCE     BRA  DIGIT      check for 1 digit

MULT     EQU    10       base 10 numbers

DIGIT    PSHS D          save D on the stack
         LDB  0,X        get next character
         SUBB #'0        subtract value of "0"
         BCS  DIGOUT     if less than "0" branch
         CMPB #MULT-1    is it a digit ??
         BHI  DIGOUT     if not, branch
         PSHS B          save number
         LDB  #MULT      ready to multiply by 10
         MUL             multiply previous MSB
         STB  1,S        save result
         LDA  2,S        get previous LSB
         LDB  #MULT      get ready to multiply
         MUL             multiply by 10
         ADDB ,S+        add current digit
         ADCA 0,S        add result of 1st mult.
         LEAX 1,X        increase X
         STD  0,S        store new number
DIGOUT   PULS D,PC       return
```

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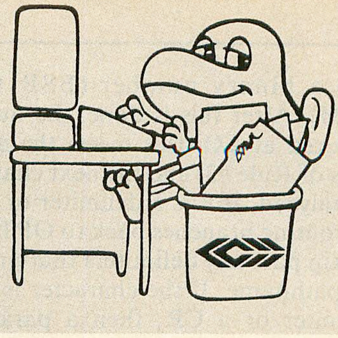

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by Brian Lantz

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into a binary number (BSR GETNUM). After this is done, the number is stored at TO (this meets the conditions of Rule #3) and the next character is analyzed. If it is a delimiter or a CR the routine branches back to OPTCHK to skip past any delimiters that precede the pathname. If the character is not a delimiter or a CR, then a parameter error has occurred. A delimiter, either a comma or a space, must separate the range options and the filename (Rule #6 again).

PLUS

The PLUS routine first converts the decimal number to binary (BSR GETNUM again), then stores it at FROM. Next, it checks the next character to see if it is a '-'. If it is, the routine loops back to OPTCHK. If not, the routine checks to see if it is a delimiter or a CR. If it isn't, a parameter error has occurred. (Rule #6).

If the next character is a delimiter or a CR the routine loops back to OPTCHK, after first storing the FROM value to TO. This is so that only the one line gets listed (from line1 to line1). This fulfills the conditions of Rule #2 and Rule #5.

The OPTOUT section simply resets Register X to point again to the character that was not processed.

Handle It

The parameter error handler routine is next. Place it after the last section that we added.

```
PARERR LEAX ERROR,PCR get the error message
       LDY  #BUFSIZ   set up a big enough buffer
       LDA  #2        standard error path
       OS9  I$WRITLN  write error message
       BRA  OUT       end LIST command
```

And, to add the error message, add these lines after Line 230:

```
ERROR     FCB  $0A
          FCC  /cat: parameter error/
          FCB  $0D
```

This is a very simple error message. In the next installment, I will explain various ways to present error messages, from the simple to the complex.

Numeric Conversion

Add the lines from Table 2 after the PARERR routine. These lines convert the decimal number given in the command line to a binary number that the computer can work with.

The listing:

```
10               * CAT Utility Command version 1
15               * Copyright 1985 Brian A. Lantz
20               *
30               NAM CAT
40               IFP1
50               USE /D0/DEFS/OS9DEFS
60               ENDC
70     TYPE      SET       PRGRM+OBJCT
80     REVS      SET       REENT+1
90               MOD       THEEND,CATNAM,TYPE,REVS,BEGIN,CATMEM
100    CATNAM    FCS       "Cat"
110              *
120    BUFSIZ    EQU       200
125    MULT      EQU       10
130              ORG       0
140              * this is the beginning of the data area.
150    IPATH     RMB       1         this is the input path #
155    COUNT     RMB       2         line counter
156    FROM      RMB       2         to store "line1"
157    TO        RMB       2         to store "line2"
160    PRMPTR    RMB       2         this is the parameter pointer
170    BUFFER    RMB       BUFSIZ    this is the input buffer
180              RMB       200       this is the stack's memory
190              RMB       200       the parameter area is here
200    CATMEM    EQU                 this ends the data area
210              *
220              * The following line sets the EDITION number to 1
230    VRSION    FCB       1
231    ERROR     FCB       $0A
232              FCC       /cat: parameter error/
234              FCB       $0D
240              *
250    BEGIN     STX       PRMPTR    save your parameter position
251              CLRA                set register A equal to 0
252              CLRB                set register B equal to 0
253              STD       COUNT     store 0 at COUNT
253.1            STD       FROM      clear FROM pointer
253.2            SUBD      #1        make D equal 65535
253.3            STD       TO        set TO pointer
253.4            BSR       OPTCHK    process options
254              STX       PRMPTR    store X at PRMPTR
255              CLR       IPATH     default input from stdin
256              LDA       0,X       place character at X in A
257              CMPA      #$0D      is the character a <CR> ??
258              BEQ       MAIN      if so, skip to MAIN
260              LDA       #READ.    set access mode for reading
270              OS9       I$OPEN    attempt to open file
280              BCS       EXIT      if an error, end program
290              STA       IPATH     store input path #
300              STX       PRMPTR    store parameter position
305              * this is the main loop
310    MAIN      LDA       IPATH     get input path #
320              LEAX      BUFFER,U  set 'X' point to the buffer
330              LDY       #BUFSIZ   set 'Y' to maximum # of bytes
340              OS9       I$READLN  attempt to read a line
350              BCS       EOFCHK    branch out if error or EOF
351              LDD       COUNT     get the current line count
352              ADDD      #1        add 1 to the line count
353              STD       COUNT     store the new line count
354              CMPD      FROM      compare COUNT to FROM
355              BLO       MAIN      if less than, loop
356              CMPD      TO        compare COUNT to TO
357              BHI       EOF       if high, end file
360              LDA       #1        load 'A' with standard output
370              OS9       I$WRITLN  write to standard output
380              BCC       MAIN      if no error, loop back
390              BRA       EXIT      otherwise, end program
395              * check for End Of File
400    EOFCHK    CMPB      #E$EOF    is it the EOF ??
410              BNE       EXIT      if not, error has occurred
```

The routine ONCE processes one ASCII digit. The TWICE routine processes two digits. The third line of the routine processes the first digit. The next line adds the second and third digits. The TWICE routine processes the fourth and fifth digits. The number given may have from one to five digits (1-65535). Once the end of the number is reached, the pointer at 'X' remains where it is.

This same routine (DIGIT) can be used in other programs for other base numbers (base 8, for instance). To do this, just change the MULT equate to the desired value, and call the DIGIT routine once for each possible digit.

On Option GOTO

Just 11 more lines and this command can handle an optional defined range of lines. The next two lines reserve storage space in the data area for the two variables that mark the beginning and the end of the range list. Add these lines right after Line 155:

```
FROM        RMB  2     to store "line1"
TO          RMB  2     to store "line2"
```

```
420  EOF       LDA     IPATH      get input path #
430            OS9     I$CLOSE    and close the path
440            BCS     EXIT       if an error, branch
450            LDX     PRMPTR     get position in parameters
460            LDA     0,X        check next character
470            CMPA    #$0D       is it a <CR> ??
480            BNE     BEGIN      if not, LIST another file
490  OUT       CLRB               clear 'B' and 'CC'
500  EXIT      OS9     F$EXIT     exit the command
505            *
510  OPTCHK    LDA     ,X+        get next character
515            CMPA    #',        check for a comma
520            BEQ     OPTCHK     if it is, skip it
525            CMPA    #$20       check for a space
530            BEQ     OPTCHK     if it is, skip it
535            CMPA    #'+        check for a "+"
540            BEQ     PLUS       if it is, branch
545            CMPA    #'-        check for a "-"
550            BNE     OPTOUT     if not, end OPTCHK
551            *
555  MINUS     LDA     0,X        get next character
560            CMPA    #'0        test low number range
565            BLO     OPTCHK     if less, branch
570            CMPA    #'9        test high number range
575            BHI     PARERR     if too high, error
580            BSR     GETNUM     convert the number
585            STD     TO         store "line2" at TO
590            LDA     0,X        get next character
595            CMPA    #$20       is it a space?
600            BEQ     OPTCHK     if so, branch back
605            CMPA    #',        is it a comma ??
610            BEQ     OPTCHK     if so, branch back
615            CMPA    #$0D       is it the end of line?
620            BEQ     OPTCHK     if so, branch back
```

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TEACH 2
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SQUARES
ROSE
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INKEY$
VAL
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ON-GOTO
ABS
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Now, to make our ranges "do their thing," add these four lines before Line 360:

```
CMPD FROM       compare COUNT to FROM
BLO  MAIN       if less than, loop
CMPD TO         compare COUNT to TO
BHI  EOF        if high, end file
```

Finally, we need five lines at the beginning of the program that will initialize the FROM and TO pointers, send the program to the OPTCHK routine and then save the new value of Register X at PRMPTER. Place these lines before Line 255:

```
STD  FROM       clear FROM pointer
SUBD #1         make D equal 65535
STD  TO         set TO pointer
BSR  OPTCHK     process options
STX  PRMPTR     store X at PRMPTR
```

The Results are in

The result is Listing 1. I made one cosmetic change by changing the command's name to CAT to keep this new version distinct from the original LIST command. And since this is the first edition of CAT, VRSION was changed to a '1'.

In the next installment, I will cover how to handle more complex error messages. Later, we will add automatic line numbering to our CAT command.

Mail Call

I received a few letters after last month's article, but I didn't receive a letter from *you*! I would appreciate any feedback on other command changes you'd like to see explained. Drop me a line. I can't give you what you want if you don't tell me what it is! See you next time in the "Utility Room." ☐

```
625            BRA      PARERR     else, a parameter error
630            *
635  PLUS      BSR      GETNUM     convert the number
640            STD      FROM       store "line1" at FROM
645            LDA      0,X        get next character
650            CMPA     #'-        is it a "-"?
655            BEQ      OPTCHK     if so, branch back
660            CMPA     #',        is it a delimiter?
665            BHI      PARERR     if not, parameter error
670            LDD      FROM       get "line1"'s value
675            STD      TO         store as "line2"
680            BRA      OPTCHK     branch back
685            *
690  OPTOUT    LEAX     -1,X       set X back one char.
695            RTS                 return from routine
700            *
705  PARERR    LEAX     ERROR,PCR  get the error message
710            LDY      #BUFSIZ    set up a big enough buffer
715            LDA      #2         standard error path
720            OS9      I$WRITLN   write error message
725            BRA      OUT        end LIST command
726            *
730  GETNUM    CLRA                set A equal to 0
735            CLRB                set B equal to 0
740            BSR      ONCE       check for 1 digit
745            BSR      TWICE      check for 2 digits
750  TWICE     BSR      ONCE       check for 1 digit
755  ONCE      BRA      DIGIT      check for 1 digit
760            *
765  DIGIT     PSHS     D          save D on the stack
770            LDB      0,X        get next character
775            SUBB     #'0        subtract value of "0"
780            BCS      DIGOUT     if less than "0" branch
785            CMPB     #MULT-1    is it a digit ??
790            BHI      DIGOUT     if not, branch
795            PSHS     B          save number
800            LDB      #10        ready to multiply by 10
805            MUL                 multiply previous MSB
810            STB      1,S        save result
815            LDA      2,S        get previous LSB
820            LDB      #10        get ready to multiply
825            MUL                 multiply by 10
830            ADDB     ,S+        add current digit
835            ADCA     0,S        add result of 1st mult.
840            LEAX     1,X        increase X
845            STD      0,S        store new number
850  DIGOUT    PULS     D,PC       return
855            *
860            EMOD                set module's CRC
870  THEEND    EQU      *          end of program
880            END                 tell ASM that you're through!
```

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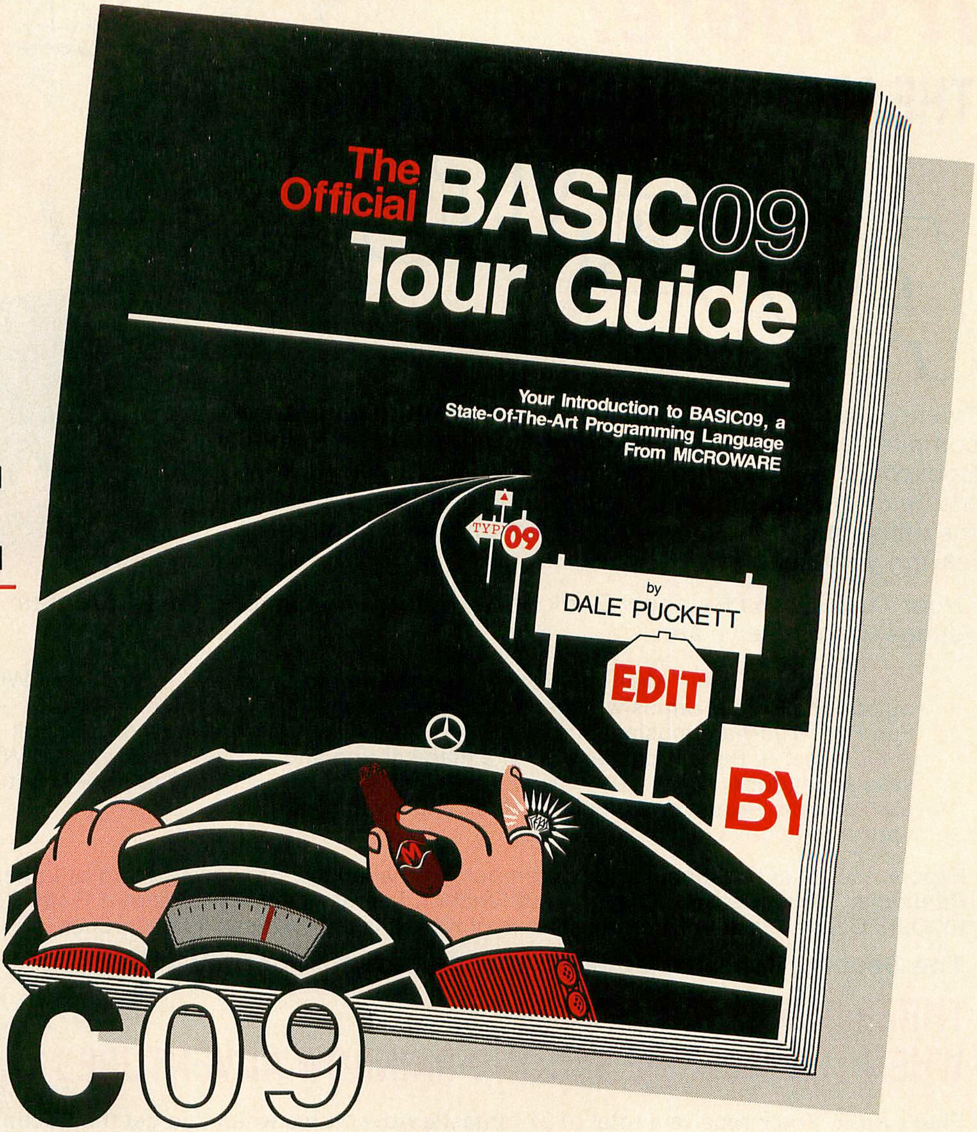
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ACCESSIBLE APPLICATIONS

An Explanation And Review Of Spreadsheet Functions

By Richard A. White
Rainbow Contributing Editor

A spreadsheet contains a variety of predefined mathematical formulas called functions. These are built-in operations that can quickly perform a task that would otherwise take much longer or might not be able to be performed at all. In many instances, functions also save memory space since they remove the need to type in long formulas.

A widely used statistical function is @SUM(X . . . Y). It simply adds up all the numbers in a row, column or block. The form shown is from *DynaCalc*. The form in *VIP Calc* is essentially the same except the range is specified as X:Y. *Elite*Calc* specifies the range in the same way, but omits the '@'. In *Elite* you use an equal sign (=) to start formula entry. For the discussion below, I will use *Lotus 1-2-3/ DynaCalc* syntax.

The '@' symbol serves to distinguish the function from a normal label entry. The characters within the parentheses form the argument of the function. An argument is information that a function needs in order to perform its task. In @SUM(X . . . Y) the argument is the cell or cells that are to be added together.

@SUM(C6 . . . C25) Compute the sum of the values in cells C6 to C25.

It does not matter whether the values have been directly entered or have been calculated by some other formula or function. However, CoCo spreadsheets and most others as well have no way of checking if a computed value is right. If the value to be used is positioned so it will be calculated after calculation of the current cell occurs, the value may not be right. As long as you know this can happen, you can handle the matter yourself by doing a number of manual recalculations to assure that all formulas and functions are using properly calculated values.

Many functions perform on a range of values. In some spreadsheets, some functions can handle a block as a range while the same function in other spreadsheets cannot. Our three CoCo spreadsheets can handle ranges and even lists of ranges and cells in some functions.

Figure 1: Sample spreadsheet and formulas

```
  [   A   ][   B   ]
1-        1        4
2-        2        5
3-        3        6
4-------------------
5-        6       21
6-
7-      3.5
8----------
9-     24.5
  [            A             ][      B      ]
1-                           1             4
2-                           2             5
3-                           3             6
4----------                   ---------
5- @SUM(A1...A3)               @SUM(A1...B3)
6-
7- @AVG(A1...A3,B1,B2,B3)
8----------
9- @SUM(A1...A3,B1...B3,A7)
```

(Richard White lives in Fairfield, Ohio, and has a long background with microcomputers and specializes in BASIC *programming. With Don Dollberg, he is the author of the* TIMS *database management program.)*

The more I dug into ways to specify the argument for @SUM( ) and other statistical functions, the more hidden power I found. In Figure 1, I show a simple example with numbers in cells A1 . . . B3 and the results of some calculations. The formula dump is shown in Figure 2. In cell A5 is a simple summation of the column A1 . . . A3. In cell B5, the summation is taken over the block A1 . . . B3.

In cells A7 and A9, we see that the functions can accept a series of ranges and single cells in the argument. This can open all sorts of possibilities in that it starts to free you from having to think about how you're going to organize the spreadsheet in order to simply perform one of these functions at the end. The spreadsheet still needs to be organized logically so you and others can easily understand it and its results when it's done.

```
@SUM(A1 . . . A3,B1 . . . B3,A7)
```

Note that each range or cell citation is separated by a comma. In addition to being somewhat faster, @SUM( ) and the other range functions are more adaptable to changes made in the spreadsheet. Figure 2 shows Column A added using a straight cell addition formula. Column B uses @SUM( ).

Figure 2: Spreadsheet using cell addition and @SUM( ) before row is deleted

```
  [    A    ][    B    ]
1-         1          4
2-         2          5
3-         3          6
4----------  ---------
5- +A1+A2+A3 @SUM(B1...B3)
```

Figure 3: Spreadsheet using cell addition and @SUM( ) after Row 2 is deleted

```
  [      A      ][      B      ]
1-               1             4
2-               3             6
3----------      ---------
4- +A1+@ERROR+A2  @SUM(B1...B2)
```

When Row 2 is deleted the spreadsheet tries to adjust the formulas. In the case of @SUM( ) it can, since the missing cell was within the defined range, which is simply shortened by changing B3 to B2. The addition formula always has three cell entries. The spreadsheet is able to adjust A3 to A2, but it cannot make the old A2 entry go away. @ERROR is entered in its place by *DynaCalc* and will be displayed when the sheet is recalculated.

Of course, a range function is not totally forgiving. If you delete the start or end cell of the range, @ERROR will be substituted. Let's now see what happens when we go the other way and insert a row and add data to it.

Figure 4: Spreadsheet using cell addition and @SUM( ) after a row and data are added

```
   [      A      ][      B      ]
1-               1              4
2-               2              5
3-             100            100
4-               3              6
5----------       ---------
6- +A1+A2+A4      @SUM(B1...B4)
```

In the addition formula, the A3 reference was changed to A4. The result returned in A6 remains '6'. @SUM( ) includes the new row and its data in its calculation and puts 115 into B6 rather than 15. In most instances, the reason you add columns or rows is to make room for a larger range of data and you expect to have the added figures included in the calculation. When using a range function and making sure the new rows or columns are between the start and end cells, you are automatically taken care of.

Figure 5: Preferred way to define a range for @SUM( )

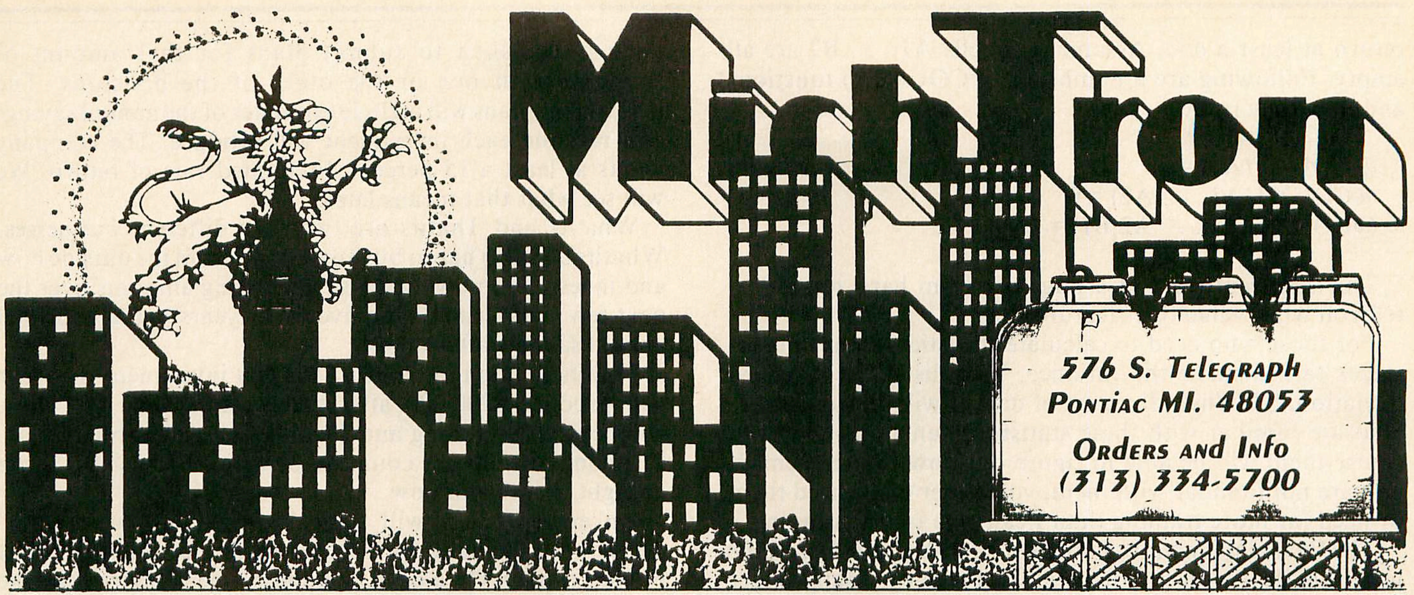
```
   [      A      ][      B      ]
1-Heading A       Heading B
2-               1              4
3-               2              5
4-             100            100
5-               3              6
6----------       ---------
7- +A2+A3+A5      @SUM(B1...B6)
```

Figure 5 shows a better way to define ranges for the @SUM( ) function. Be careful since it is the wrong way to describe a range to other functions in some spreadsheets. I inserted a row at the beginning of the sheet and have shown column headings. I left the formula now in A7 alone to show how the sheet will adjust formulas.

I changed the range of @SUM( ) to include both the cell containing the heading and the cell containing the dashed line indicating a summation. B1 and B6 have math values of zero and will not affect the summation. When adding extra lines for data, you are most likely to add them below the heading or above the dashed line and will always have your new lines within the range.

@COUNT( ) is another range function. @COUNT( ) counts only those cells that have a mathematical value, including a zero — at least that's the way it works in *Elite*Calc* and *DynaCalc*. My version of *VIP Calc* counts all cells in the range whether they have anything in them or not. (In fairness, I am using one of the early editions of *VIP* and that problem may have been fixed.) In *Elite*Calc* and *DynaCalc*, @COUNT( ) ignores all blank cells, including all cells containing labels. If you use *Lotus 1-2-3* at the office, be aware that it considers cells containing labels as having a zero and counts them.

@COUNT( ) in *DynaCalc* has one other feature (read maybe bug) that it shares with *1-2-3*. @COUNT(A1) will return a one *even if* A1 is blank. Further, any @COUNT( ) function whose argument contains a single cell reference will



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by Steven Hirsch

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ROMMEL 3-D

By Kary McFadden

You clutch the tank controls, searching for any sign of the enemy. Suddenly a blip appears on radar! Frantically, you move your tank into position. At last you spot the elusive enemy tank! Facing it, you race to lock sights and fire before he does!

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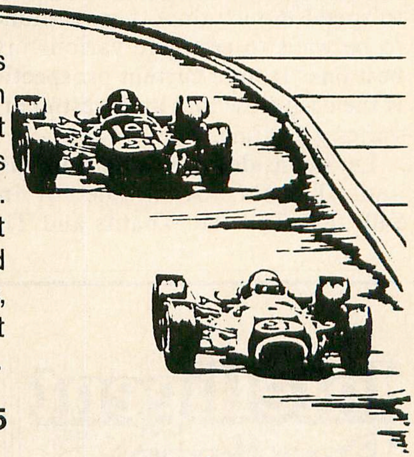

return at least a one. Assume that cells A1 . . . B2 are all empty. Following are a number of @COUNT( ) functions and how they react.

@COUNT(A1) = 1
@COUNT(A1 . . . A2) = 0
@COUNT(A1 . . . A2,B1) = 1

This apparently is not a bug, but I am hard pressed to tell you what value this "feature" has.

For those who need to calculate statistics, many spreadsheets can calculate the variance, VAR(list), and standard deviation, STD(list), for a set of data. I will presume those who are familiar with these statistical functions and need to use them will be able to figure out how to use them. If you are not familiar with them, you either don't need them or need far more training than I can give in the column.

The financial functions built into *VIP Calc* and *DynaCalc* generally deal with the time value of money. Many larger businesses use the time value of money to select their investments. The idea is that there are always more ways to spend money than there is money to spend. There need to be ways to compare various investments to choose the best ones from a current prospective. One of the problems is the cash flow that an investment may generate each year varies with time.

Let's consider a fictional company that makes "Whatits" and "Thatits." Available for investment this year is $400,000, and the Whatits and Thatits division managers have been asked to submit plans for that amount of investment in one or the other of the divisions. The investment plans will include estimates of the annual savings and revenue each investment will produce. The company wants at least a 15 percent discounted rate of return. We will see what that means later.

Whatits and Thatits are two very different businesses. Whatits division has to buy some parts from the outside now and investment now would save growing amounts over the next few years, stabilizing five to six years out at $150,000 annual savings after taxes.

Thatits is booming and a $400,000 investment this year will produce $200,000 after tax revenue next year. But, competition is coming and Thatits is sort of a trendy item. The company cannot count on being in the business seven or eight years from now.

An entrepreneur will typically make a "gut feeling" decision on the data. In this case neither decision will lead to bankruptcy. On a cash flow basis, one is better than the other and should maximize company profit and strength. @NPV( ) is a tool to make the choice. Figure 6 shows the spreadsheet.

Figure 6: A project return analysis spreadsheet

```
     [     A       ][   B    ][   C    ][   D    ]
  1-                 PROJ 1    PROJ 2    PROJ 3
  2-                 WHATITS   THATITS   WHATITS
  3-
  4-INVEST TODAY     400000    400000          0
  5-
  6-
  7-RETURN
  8-    YEAR  1       25000    200000    -25000
  9-    YEAR  2       50000    175000    -50000
 10-    YEAR  3       75000    150000    -75000
 11-    YEAR  4      100000    100000    100000
 12-    YEAR  5      125000     75000    125000
 13-    YEAR  6      150000     50000    150000
 14-    YEAR  7      150000     25000    150000
 15-    YEAR  8      150000         0    150000
 16-    YEAR  9      150000         0    150000
 17-    YEAR 10      150000         0    150000
 18-
 19-TOT. RETURN     1125000    775000    825000
 20-
 21-NET PRES VAL     478174    530344    260454
```

Project 1 and Project 2 represent the respective proposals of the Whatits and Thatits division managers. Each proposes to invest $400,000 this year. Project 1 returns much more cash to the company over 10 years, but much of the return comes in later years. Project 2 returns lots of cash in the early years and then diminishes. A primary question is which project has the greatest net present value? Cells in Row 21 contain a @NPV( ) function. The one in B21 reads:

@NPV(.15,B8 . . . B17)

Cells C21 and D21 have similar formulas adjusted for their column positions. One way to look at @NPV( ) is that the current value of money earned in the future is reduced by the compounded interest that amount of money would earn between then and now.

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If I buy a $1,000 two-year CD, two years from now I have the $1,000 plus earned interest. If I invest $1,000 now in an asset, earn no interest over the next two years and then sell it for $1,100, I will certainly have less money at that time than if I had put the money into the CD. The net present value of the asset is less than the net present value of the investment in the CD.

Therefore, the first argument in @NPV( ) is the interest rate or the rate I expect or need the capital I invest to be returned — rate of return for short. It is entered as a decimal number though we talk about 15 percent interest. The next argument specifies the range over which @NPV( ) works.

There is one big "beware" when you use @NPV( ). The first entry in the range must apply to the first interest period; each succeeding entry must pertain to a succeeding period. The periods must be equal. For most applications, use an annual interest rate or rate of return entered as a decimal number rather than a percentage, and have your periods be years.

Now we can see differences between the two projects. Project 1 has a larger total return, but Project 2's net present value is better. A more sophisticated analysis would show that Project 2 would pay back its capital investment much sooner making more money available earlier for other investments. And who can say for sure that the Whatits business will really be as projected five years from now? Certainly, the projection of the Thatits return over the next two years is on much firmer ground.

On the basis of the spreadsheet, the company should invest in Thatits now while they address what to do about the Whatits business. There is some time to act there, while there isn't in the Thatits business.

One option is to invest the $400,000 three years from now when Whatits savings start to peak. The net present value of that approach is only $260,000, but the net present value of the investment three years out is also about $260,000. The company can afford to wait and still meet their investment objectives.

What if you won a million dollars in your state lottery? It really isn't worth a million to you now since it will probably be paid in 20 yearly payments with the first one this year. In the meantime, the Lottery Commission will invest some money at a good rate and expect to pay you your annual installments out of the interest they earn. At the end of 19 years, they keep their investment.

Figure 7: Net present value of a $1,000,000 state lottery win

```
    [   A     ][B ][   C   ]
 1-
 2-AMOUNT             1000000
 3-
 4-NPV                 468246
 5-
 6-     YEAR     0      50000
 7-     YEAR     1      50000
 8-     YEAR     2      50000
 9-     YEAR     3      50000

24-     YEAR    18      50000
25-     YEAR    19      50000
```

In this case, you are paid $50,000 now so it has its full value. Next year's payoff will be the first one used in the NPV computation. The formula in C4 is +C6+@NPV(.1,C7 . . . C25), assuming a 10 percent interest rate. If you are disappointed, try computing the NPV of $0.00 installments over 20 years! □

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KISSable OS-9

A Time For Reflection

By Dale L. Puckett
Rainbow Contributing Editor

Christmas and New Year's are almost upon us. For Christmas, I hope you find some new OS-9 software in your stocking. As for the New Year, I hope we all get to see the new Color Computer everyone's been talking about for the past two years. We'll cross our fingers.

In any case, the holidays give us a few days away from the grind and time to relax as we reflect on the past and plan for the future. We have another column full of OS-9 treats and tips this month. We'll take a look at a new OS-9 mouse-driven word processor and pass along a few tips from professional C programmers. But first, let's make up our wish list for next Christmas. We need to give the Software Developers in the OS-9 Community a head start.

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, *and co-author, with Peter Dibble, of* The Official Rainbow Guide to OS-9. *He is a chief warrant officer in the U.S. Coast Guard and lives in Alexandria, Va.)*

Intuitive Software

The computer business has been in a slump most of this year. While both Apple and IBM have been having problems, Atari and Commodore have thrown their fate to the wind — teaming up with Madison Avenue and locking horns to see which one of their new 68,000-based machines will catch the public's attention and stir the imagination of software developers.

On the surface, the OS-9 community appears to have been sleeping through the slump. Very little new software has been announced this year and the products that have been released have, for the most part, been a rehash of old technologies. Yet, under this calm, I sense a swell of excitement and imagination. Developers seem to be working on products that will run on new hardware designed to knock down the age-old barriers of speed and memory. Other hardware is opening the door to the world of graphics.

Microware has grown to the point that it can advertise in the most professional trade journals, meeting AT&T and IBM on their own turf. And, they've announced a new software driver that mates OS-9 with the new graphics chip from Hitachi — one of the best in the world. That driver uses the same graphics standard as the one used by AT&T and IBM.

In the meantime, UNIX has proven to be too large and rigid for many applications. OS-9 with its fast and modular code has become the answer for many Original Equipment Manufacturers. And, some of these OEMs have big names.

Since we have all been pioneers running OS-9 on the Color Computer, let's stop and think about what we want this new generation of hardware and software to do. If you have a pet wish, drop us a line and we'll share it with our readers. To get you started, I'll share some of the things I would like to see.

If OS-9 is ever going to be a success in the consumer world, we must see some intuitive software hit the market. Look at the rough start OS-9 had on the Color Computer. Hundreds of people came out of the woodwork to complain about the documentation from Tandy. When you look at it academically, the OS-9 documentation is among the best in the business. From a reference standpoint, everything is there. The problem

NEWS RELEASE
October 1st, 1985

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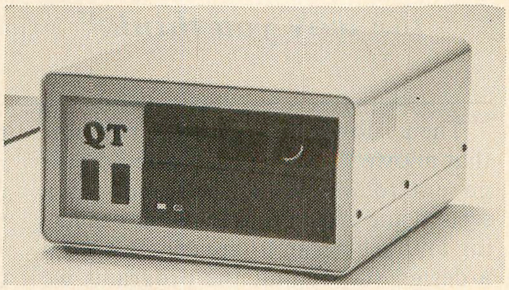
Frank Hogg Laboratory announced their new **QT Plus** computer system today. The **QT Plus** computer joins FHL's standard **QT** computer system as part of their product line. The **QT Plus** is the second 68000 based computer system the company has released this year.



The QT Plus differs from the standard QT in several ways:

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surfaced because an operating system as powerful as OS-9 with its hierarchical directories and multitasking was something new. Many of the pioneers that bought OS-9 for the Color Computer had no idea what they were getting. Essentially, they didn't know what they needed to look up.

After this shaky start, the application programs began to show up on the market. However, most of them were simply recoded versions of software that had been running on the FLEX operating system or the pseudo-disk operating system in the ROM in the Tandy disk controller. At first, few of them took advantage of OS-9's ability to allow multitasking.

Then, slowly but surely, programs that allowed you to read a directory or go out to the OS-9 Shell and run a second and third program while executing another began to appear. But from a design standpoint, the programs we have seen for OS-9 so far have stuck with older concepts. Most are command line oriented; few use the graphics capabilities built into the Color Computer.

During the past summer, a few programmers started to break from the past. Jeff Francis, working for Bob Rosen at Spectrum Projects, advanced the state of the art for OS-9 programs on the Color Computer to the realm of menu-driven software. The *OS-9 Solution* was a great leap forward. This program is almost intuitive and is bound to ease the entry into OS-9 for many people. Yet, it is based on a rigid menu. Essentially, it brings us to the era of software technology used by the Wang dedicated word processors during the past five or six years.

I hope no one takes our comments this month as criticism. We are not complaining, rather, we are shooting for pie in the sky, attempting to stimulate your imagination so that you can influence software developers to harness the power that's built into OS-9.

What do we mean when we say we need intuitive software? First, we'll dare to take a utopian viewpoint and state that we mean software that doesn't need any documentation. If you've been using the older OS-9 application software you probably feel that software without documentation is an impossible goal. But, it's not. During the past six months I have been using software, both at home and at work, that doesn't require a user's manual. Believe it or not, it is intuitively obvious what you need to do a job. This giant leap forward was made possible by designers who made their software work the way people think.

In the past this wasn't possible and designers had to write the software the way the machine wanted it. But today, powerful operating systems like OS-9 are helping designers break this bond with the machine. They are making it possible to turn these small, desk-top machines into powerful tools that can be used by anyone to do almost anything.

Another thing that makes this new generation of software work better is that most major developers have stuck with a standard. When you save information from your database manager, spreadsheet or word processor — it doesn't matter which one — you do it the same way. All Editing operations work the same way: delete a character on each application program using the same steps; move data or blocks of text from one part of a document to another using the same steps.

Essentially, on a well-designed system you have one standard way to do each job. Once you learn how to run one program, you know how to run all programs. You quickly find yourself out of the learning curve and into a very productive environment. Isn't that why we bought our computers?

Driving with a Mouse

The designers at Tandy must have known something that we have been too proud or stubborn to admit. They came out with a mouse for the Color Computer more than a year and a half ago.

I must confess that when the idea of using a mouse first hit the trade publications, I thought it was utterly ridiculous. "If I get so lazy I can't type a command line, I better get out of the business," I thought. I was wrong.

> ***"Using a mouse doesn't mean you are lazy. It means you are effective. A mouse lets you work the way you think."***

Using a mouse doesn't mean you are lazy. It means you are effective. A mouse lets you work the way you think. You select an object — a character, word or sentence in a word processing document for example — by pointing to it. After selecting it, you do something to it. For example, you can simply delete it, cut it out and save it, copy it, or take it and paste it somewhere else in your document. This algorithm matches the way most people think. Journalists, for example, have been using scissors and tape to cut and paste news stories since newspapers have been published.

Granted, you can cut and paste on a computer without a mouse. Usually, you use the terminal's arrow keys to move the cursor to the beginning of a block of text and push a key to mark the beginning, then you must use the cursor keys again to move the cursor to the end of the block. When you arrive at your destination, you must hit yet another key to mark the end of the block. Still, you aren't done. You must go back to the cursor keys and move the cursor to the point where you want to insert the block of text. These actions are two-dimensional and unnatural. With a mouse, you simply move the arrow on the screen to the beginning of a block, hold down the button and drag the arrow to the end of the block. When you arrive, simply let go of the button. To move the block selected, you move the arrow to the insertion point and hit a single key and you're done.

Where are our Desk Applications?

Dave Gibson, the new secretary of the OS-9 Users Group, called me one day nearly a year ago with an idea. "Why doesn't someone write a SideKick for OS-9?" he asked. That's a very good question and I'm glad I finally got around to sharing it with you.

As was the case with the mouse, I had to use a powerful desk accessory in order to realize it was a very handy tool. An anecdote here should make the point nicely: How many times have you come up with a great idea while you were busy working on a spreadsheet? Without a desk accessory program such as *SideKick*, you had two courses of action available. You could pick up a pad of paper and write a note to yourself — or you could exit the spreadsheet program and call up your word processor to write yourself a note.

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paper is hardly automated. Besides, when you write short notes on small pieces of paper you wind up with a cluttered desk and usually can't find them — at least not when you need them. The second approach is counterproductive because it takes too much time. If your ideas are fleeting, you'll find they pop out of your mind by the time the word processor gets going.

The real OS-9 shakers (especially those with OS-9 Level II computers, which give them access to more than 64K of memory) haven't been stifled by this problem. They have been using OS-9's multitasking capability for a long time. Many programs, *DynaCalc* and *DynaStar* for example, let you escape to an OS-9 Shell. You then use this Shell to start another process to do the second job. Essentially, if you have been running OS-9 with enough memory, you've had a host of powerful desk accessories online all along.

It makes you realize how far ahead of the IBM crowd you are in this arena when running an OS-9 Level II system. IBM users have had formal desk accessory programs at their fingertips for several years now. However, until recently, none of them had a multitasking ability. In other words, you had to completely stop whatever program was running — even though you didn't need to exit it — to do another job with a desk accessory. Compare this with OS-9, where you can escape from a program to use a Shell to start another time-consuming job working in the background, while continuing work on your original application.

Gibson was talking about an integrated desk accessory system. For instance, as I type this column, I can reach over to a menu bar, push a button and do any of the following jobs: take a note from a phone conversation; record a phone number; dial a phone number; add an item to my calendar; add an item to my "to do" list; look up an area code; use a powerful calculator; cut the answer out of the calculator and paste it in the document I am writing; display a clock that gives the time; call CompuServe and download the latest news on the OS-9 SIG; or print another text file. In fact, several of these small accessories can be running at the same time. The program is the new version of *SideKick* that runs on the Macintosh.

Now let's look at two facts. This is the first set of desk accessories to allow multitasking on the Mac. You have been using multitasking since the first day you fired up OS-9. All we need now is for someone to put together a package of short utilities that can be summoned by hitting a yet undefined escape key. That key would take us to a menu where we could point to a tool and push a button to use it. Believe me, OS-9 was made to write this type of application. Start talking about it with your favorite developers.

Where's 'ThinkTank' for OS-9?

And while we're making that wish list for next Christmas, when is someone going to write an outline processor that runs on OS-9? This is another application I was skeptical about at first. I waited several months after buying *ThinkTank* before using it. Now, I use it for almost everything I write.

Here's a typical scenario. You need to write an article for your club newsletter. You met with the club president after the last meeting and he gave you a list of topics he would like to see covered. When you got home that night, you typed the title of each topic on a single line using *ThinkTank*.

You have just outlined your article. Several days later you look at the list and get some ideas for a couple of the topics. You call up *ThinkTank*, point to the tail of one of these headlines, hit RETURN and enter your ideas. Throughout the month you make phone calls to gather information about each topic in the outline. As you get the information on each topic, you point to that headline in the outline, push a button to open a text window and enter the information obtained on the phone. When it is all entered, you simply close the window.

Finally, at the end of the month after finishing all of your research and entering the information in a window under each headline, you send the article in to the editor. You call up the outline, look at it and decide the topics are right but the order is wrong. No problem — you point to a headline, hold down a button and drag it to another position in the article.

Here's the magic: When you finish putting the headlines in order, your entire article will be in order because the text you typed in a window under each headline went with the headline when it was moved. You have, quite simply, reorganized the article by rearranging the headlines.

How about it, Tandy? How about it, third party developers? OS-9 is a powerful enough operating system to make the job easy. Essentially, all you need is a series of pointers to the headlines.

One-Liner Contest Winner . . .

This one-liner displays all the numbers from zero to 255 with their hexadecimal and binary equivalents.

The listing:

```
1 PMODE4,1:PCLS:G=PEEK(186)*256+
PEEK(187):FORN=0TO255:POKEG,N:PR
INTN"  "HEX$(N)"   ";:FORX=0TO7:
IFPPOINT(X,0)THENPRINT"1";:IFX=7
THENNEXT:PRINT:NEXT:ELSENEXT:ELS
EPRINT"0";:IFX=7THENNEXT:PRINT:N
EXT:ELSENEXT
```

Todd Knudsen
Sandy, UT

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

One-Liner Contest Winner . . .

This one-liner draws a picture of a hand-cranked siren, then plays a siren sound.

The listing:

```
10 PMODE3,1:PCLS:SCREEN1,1:DRAW"
BM50,100;U99;D200;E80;R70;U50;L7
0;H80":DRAW"BM150,100;R50;U10;L5
0;D10;R50;U15;L50;U10;R50;D12;R3
0;D20;R15":PAINT(100,50),3,4:FOR
 T=1TO10:FORS=200TO245STEP1:SOUN
D(S),1:NEXT:FORS=245TO200STEP-1:
SOUND(S),2:NEXT:NEXT
```

Joseph Gombosi
Lockport, IL

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

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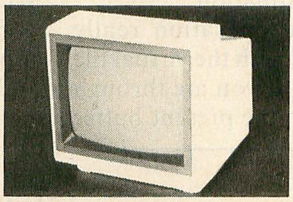

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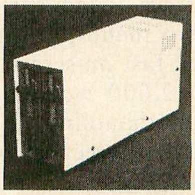

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These pointers in turn are linked to pointers that point to sub-headlines, or blocks of text that relate to them. It would be a great tool!

The Last Word

Let's move from our wish list to reality. At least one developer in the OS-9 community has dared to be different and attempted to move his software into the realm we've been describing. It's a move I approach with much optimism since every great journey starts with a single step.

> ***"Bailey has made* The Last Word *especially intuitive. I tested it without reading the manual; that's about as severe a test as can be offered."***

Mike Bailey of Unified Software (525 South Chestnut St., Cameron, MO 64429) has finally released his mouse-based word processing program, *The Last Word*. It implements many of the theories we listed earlier, including: pull-down menus, point and press file selection, fast on-screen formatting, an online 22,000 word dictionary and virtual file handling. It works with its own Hi-Res screen or with *Word-Pak* from PBJ.

The Last Word is a big step toward the future; Mike tells me he had quite a time making it all fit in the limited workspace available with OS-9 Level I. In fact, he had to leave the dictionary look-up feature out of the Hi-Res version because of the extra memory required by the screen. This feature works extremely well in the *Word-Pak* version and is a fantastic tool for writers.

Bailey has made *The Last Word* especially intuitive. I tested it without reading the manual; that's about as severe a test as can be offered. As an example of the intuitive nature of the program, look at the cursor control scheme. The cursor is moved one position by moving one of the four arrow keys in the proper direction. To move to the next word, hold down the SHIFT key and strike the right- or left-arrow key. To move to the top or the bottom of the screen, hold down the SHIFT keys and strike the up- or down-arrow key.

If you're really in a hurry, move to the left or right end of the line you are on by holding down the CLEAR key while striking the left- or right-arrow key. Likewise, move to the top or bottom of the active text buffer by holding down the CLEAR key and striking the up- or down-arrow key. If you'd rather move along a line from tab stop to tab stop, rather than word to word, hold down the CLEAR key and type a 'T'. If you're moving a long distance, however, it's much easier to take the mouse and move the cursor to the destination.

The mouse-based operation really shines when coupled with the virtual file handling capability. If you are through editing everything in the present buffer and need to move on to another paragraph that's still on the disk, you don't even need to think about it — just use the mouse to drag the cursor to the bottom of the screen. *The Last Word* automatically goes to the disk file and reads in additional text. If you didn't hear the disk drives start up you'd hardly notice that the program had to go to the disk.

Likewise, if you forgot to make a change in a portion of the text that has already scrolled onto the disk, simply take the mouse and move the cursor past the top of the screen. When you do this, *The Last Word* will read in the information from the disk automatically and continue to scroll backwards in the file until you let go of the mouse.

The point-and-click philosophy is evident everywhere in *The Last Word.* To edit a file, put the cursor on the menu title named *FILE.* The word FILE is highlighted and you can click the button on the mouse or joystick or strike the ENTER key. When you do this, a pull-down menu folds out of the menu bar. You then pull down the cursor to your selection. For example, if you need to make some changes in a source code file, pull the cursor down until the word EDIT is highlighted. Once you see it light up, simply click the mouse button again and you'll be greeted with a prompt line at the top of the screen.

At this point you can type in your filename. But, if you can't remember the name of the file, simply click the mouse button or strike the ENTER key. After doing this, a box is drawn on the screen and a list of filenames are displayed in the box. Move the cursor on top of the file you want to edit and click the mouse button again. Almost instantly your file is opened and you can begin editing.

The dictionary look-up feature in the *Word-Pak* version of *The Last Word* works the same way. Point to any word in the text by placing the cursor anywhere in the word. Then, go up to the MISC menu and pull it down to the word "LookUp." After doing this, a box appears on the screen and a list of similar words is displayed in the box. If the correct spelling for your word is in the box, simply move the cursor on top of that word and click the mouse button. Like magic, the word is corrected with your selection.

To change the format of the text, you also point and click. To change a format, move to the menu bar and select FORMAT, pull down the menu and select your choice of format and click the mouse. Then, move the cursor into any format line and click the mouse again. *The Last Word* lets you insert format lines anywhere in the text and this makes it easy to make the text appear just the way you want it. You can left-justify your copy, right-justify it or double-justify it. The latter means you will have even margins on both sides of the page. You can also center a number of lines of text, a feature that comes in handy many times.

Yet, despite his intuitive, progressive approach to this word processing program, Bailey gives the option of doing things the old way if you like. You can exercise every option in the program without a mouse or joystick if you like. If you can't stand using a menu, you can use a series of shorthand commands.

Presently, the restrictions in *The Last Word* are hardware imposed. For example, with the Hi-Res screen version there was not enough memory left in the work space to allow the use of the LookUp routines. And, even in the *Word-Pak* version, the wild card algorithm had to be removed from the LookUp code so it could fit and run within the work space. However, this program is a giant step in the right direction. With the new hardware we all hope to see soon, it will be dynamite.

Bailey also sent us a program called *PixDump*, which lets you dump a file containing a bit map of your CoCo screen to your printer. The C source code for *PixDump* is printed in this column. The code in the listing is set up to work with a Gemini 10-X printer.

To make it work with my Epson, I made three changes. I added a "\07"

OS9 + X = POWER

XTERM

XTERM is a full featured OS-9 communications program that takes full advantage of the power of OS-9. It works with the normal text screen, XSCREEN, or the Wordpak 80 column board.

XTERM is menu oriented for ease of use, it is simple to use even for the novice OS-9 user. And yet, XTERM is powerful enough for the expert OS-9 user.

Some of the features of XTERM include: full upload and download support with remote buffer operation; supports XON/OFF protocol; 110/300/600/1200 baud, 5/6/7/8 bits, even/odd/no parity, full or half duplex; able to execute an OS-9 shell command from within XTERM.

XTERM works with a Color Computer using the standard serial interface, but also will work with a hardware serial port. Also, if you are using a hardware parallel printer port, you can print data to the printer as it is received.

Now includes XMODEM protocol and function keys.

XTERM $59.95

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XMENU

XMENU is a system that creates a menu-driven environment for the Color Computer using OS-9. OS-9 now becomes easy-to-use with command selections made from menus. Menus are included to access OS-9 commands. An easy-to-use utility is provided that allows for the creation and maintenance of menus.

XMENU works with XSCREEN, the normal text screen, O-PAK, and the WORDPAK 80-column board.

XMENU $29.95

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XSCREEN

XSCREEN creates a high resolution screen for the Color Computer using OS-9. This high resolution screen gives you 24 lines of text with 51, 64, or 85 characters per line. Characters can be either white on a black background or vice versa. Easy menu operation.

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A package of two powerful utilities you won't want to be without. XDIR is an OS-9 directory program that prints full hierarchical directories. The directory does full sorting and has complete pattern matching, including wildcard and character classes.

XCAL is a powerful calculator for OS-9. Ideal for both programmers and for general use. XCAL features include: work in decimal, hexadecimal, binary; previous 25 results are stored; functions include AND, OR, NOT, XOR.

XDIR & XCAL $24.95

WITH SOURCE
$49.95

XWORD

XWORD is a powerful word processing system for the Color Computer using OS-9. XWORD is feature packed with only a few features mentioned here.

Some of the editing features of XWORD include: true character oriented full screen editor; works with the normal text screen, XSCREEN, O-PAK, or WORDPAK 80 column card; full block commands with blocks displayed in inverse characters (except with normal text screen) for easy block manipulation; file size not limited to a buffer size; full find and replace commands with wildcard character; able to execute an OS-9 shell command in the middle of editing. Many, many more features, too many to mention here.

Some of the formatting features of XWORD include: proportional spacing supported; perfectly aligned hanging indents and columns, even when using proportional characters; full printer control with control of character size, emphasized, italics, overstrike, underlining (with or without spaces), super and sub-scripts; up to 10 header/footers; page numbering in decimal or Roman numerals; margins and headers can be set differently for even and odd pages; automatically reads printer initialization file to define XWORD for your printer (many included, and easy to write or modify your own). Many more features.

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XED

XED is the editor portion of XWORD. XED includes all of the editing features listed under XWORD above. XED is for people who need a full featured screen editor but do not need all of the formatting power of a word processor.

XED $49.95

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following the "\x31" in all three lines of the array "grafinit," used "sdump (3, 2, 2);" in "main" and added a line feed in the write statement that prints out each line of pixels. The first line in that routine looks like this: "if (— bitrow < 0) {." Note that when adding an item to a write statement you must change the last parameter. To do that, change the "#define STRSIZE 4" to "#define STRSIZE 5" and change the 'l' to '2' in the write statement where you add the "\l." Note also that the 'l' is a lowercase "ell," not a numeral one.

You can configure *PixDump* to your printer by looking up the required code in your printer manual and placing it in the proper code. The source is well-commented, so you shouldn't have any difficulty.

ThunderDupe 2 from Bob Rosen

Bob Rosen at Spectrum Projects, Inc. (P. O. Box 21272, Woodhaven, NY 11421, phone: 718-441-2807) seems to be sticking by his pledge to fully support OS-9 products.

He has just released a program called *ThunderDupe 2* that works with his 256K *Thunder RAM* upgrade and lets you copy a full OS-9 disk in only one pass, including formatting. He uses it with four disk drives to make four commercial distribution copies of his *OS-9 Solution* and *OS-9 RamDisk* software. It also works with normal single-sided, 35-track Radio Shack Disk BASIC and *Graphicom* picture disks as well as any single-sided CoCo format OS-9 disk.

By running a BASIC utility program that comes in the package, *ThunderDupe 2* can be altered to copy 40-track, single-sided disks. In this mode it will also copy Model III and 4 single-sided disks. It will not work with copy-protected disks, FLEX disks or double-sided disks. *ThunderDupe 2* was written by Marty Goodman.

ThunderDupe 2 works by reading every bit of data off of your standard 35-track, single-sided drives and storing it in the *Thunder RAM*. After reading the master disk, remove it and put your blank disks in all available drives. When it's finished, *ThunderDupe 2* beeps. It also signals you by lighting the light on your disk drive if it senses a bad copy. If you don't trust "idiot" lights, you can read the printed report on your CoCo screen. The program comes with the C source code.

Putting D.P. Johnson's 512K *RAM Disk* to Work

While we're on the subject of RAM disks, we'll pass on the information about D. P. Johnson's CCRD 512K RAM disk we received from Michael D. Revnell of Las Cruces, NM. He finds it very handy when working with the Microware C Compiler from Tandy.

Here's how he operates: "The modules 'cc1' and 'c.prep' control where the libraries and defs files are accessed during a compile," Revnell writes. "I dumped the two files containing the modules and found one place in each one containing the null terminated string, /D1. Using the Microware Debugger, I changed these to /r and I can now compile a C program with no access to the floppy disks. These are the patches."

Module	Offset	Old	New
cc1	0EE5	64	72
	0EE6	31	00
c.prep	135C	64	72
	135D	31	00

Listing 1:

```
/* flist.c

 * text editor setup stuff
,ru 80,0,4,8,12,16,20,24
 *
 * flist.cfile list utility
 *usagefile <filename> [<filename>*] >/<printer>
 *no options recognized
 *Output is to StdOut so redirection is necessary
 *Screen Output is possible but not too useful.
 *
 */

#include <stdio.h>

#include <time.h>

#define void int  /* dummy function return type */
#define LINES 66/* number of lines on printer page */
```

Remember, if you save the modified modules into new files, you must run the OS-9 Verify utility to update the CRC of the modules before you can load and run them.

Once the two modules are modified, you must still solve the problem of getting all of the files and directories from your floppies into your RAM disk. Revnell gets the job done with the start-up file below. His start-up disk also contains a copy of *Stylograph III* word processing system.

```
setime 85
load ccrd r
sformat /r r"ccrd"
chd /d0
dsave -s15 /d0 /r ! shell
```

After the first disk has been moved to the D. P. Johnson RAM disk, he removes the start-up disk, inserts the C Compiler disk in Drive 0 and the C Library disk in Drive 1, and types the following command line.

```
chx /r /r/cmds;chd /d0;dsave
-s15 /d0 /r/cmds ! shell;  chd
/d1; dsave -s15 /d1 /r ! shell;
chd /r /r/progs
```

Note that he types both lines on one command line. (It is printed in four lines so it will fit in the magazine.) If you don't like to type long command lines like this one, save it on your start-up disk and have your start-up procedure copy it to the RAM disk. Then, all you need to do is change your disks and type the name of that file — you'll need the complete pathlist — and OS-9 will do the job for you.

Revnell also contributed the listing of another file listing program written in C. This one lists files with both a header and a footer and numbers lines in a manner consistent with the error diagnostics produced by "c.pass1." Incidentally, if you type a comment that begins in space one, which looks like this — /*page*/, the listing skips to the top of the next page.

COMM-4: Four Serial Ports on One Card

On the new hardware frontier, CoCo Devices (Box 677, Seabrook, TX 77586, phone 713-474-3232), has announced a new plug-in cartridge that gives you four serial ports online. You can hook up a terminal, a modem, a letter-quality printer and a high-speed printer to your Color Computer all at the same time.

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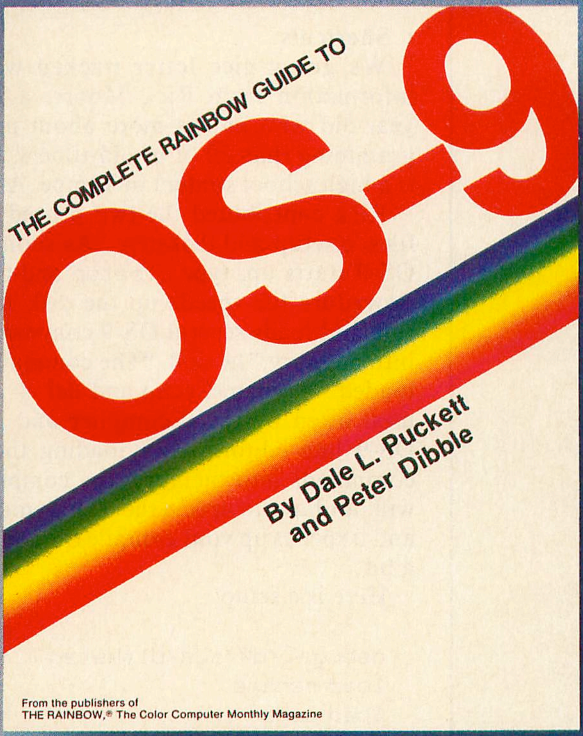
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```
#define BUFFER 132/* size of line buffer */
#define WIDE 80/* wide of printer page */

struct sgtbuf *time;/* a place to put system time */
FILE*input;/* where the stuff comes from */
chariobuff[BUFFER];/* line buffer */

int main (argc,argv)
int argc;
char *argv[];

{
if ( argc < 2 )
listfile ( stdin , "Standard Input" ) ;
else
{
int i;
for ( i=1 ; i<argc ; i++ )
{
int page=1;
if ( ( input = fopen ( argv[i] , "r" ) ) == NULL )
  fprintf (stderr , "flist > Unable to open %s\n", argv[i];
else
{
listfile ( input , argv[i] ) ;
fclose ( input ) ;
}
}
}
}

/*page*/
void listfile ( input , filename )

FILE *input;

{
int first = 1 , line = 0 , lineno = 1 , page = 1 ;
fprintf ( stderr , "flist > Listing file %s\n",filename);
getime ( time ); /* get system time */

While (fgets ( iobuf , BUFFER-5 , input ) != NULL )
{
int j ;

if ( ( line == 0 || ( strcmp ( iobuf , "/*page*/\n" == 0 ) )
{
int footlen;
footlen = footer ( page , first ) ;
line = LINES - footlen - header ( filename , page++ );
first = 0;
}

/* a line of up to BUFFER-6 characters is read into
 * iobuf.  A four character line number is placed
 * into the buffer at the beginning of the line.  If
 * the line is longer than WIDE characters already or
 * this causes the line to go off the end of the page
 * the remainder of the line is printed on the next line.
 */

 fprint ( stdout , "%4d: " , lineno++ );
 if ( ( j = strlen ( iobuf ) ) <= WIDE-7 ) /* normal stuff */
 {
 line-- ;
fputs ( iobuf , stdout );
  }
  else /* too long a line */
  {
  fputs ( iobuf , stdout ) ;
line -= 2;
  }
 }
 printf ( "\f" ) ;
}

/*page*/
int footer ( page , first )
```

built, allowing multitasking and simultaneous I/O without using software timing loops. Full modem control is available and all communications with the ports are interrupt driven. Two of these cards may be connected if you need eight serial ports. Connection to the card is made with standard RS-232 DB-25 plugs. The introductory price of the unit is $89. After January 1, 1986, the price goes to $108.

C Shortcuts

We got a nice letter packed with information from Rick Moore, a 17-year-old who knows more about programming than 30 of us old-timers. He is a high school student in Tempe, Ariz.

Rick contributed the two procedure files, c.setup and diskstep. "As soon as OS-9 starts up, type `c.setup` and this procedure file speeds up the disk step rate and loads several OS-9 commands into memory," he said. "The commands loaded — rename, echo and del — are used often by the C compiler and the OS-9 line editor. After loading these commands into memory, the compiler will not have to access the disk as much and it speeds up your compile time quite a bit.

Here is c.setup:

```
debug </d0/sys/diskstep
load rename
load echo
load del
echo
echo Now insert your C Compiler
disks.
```

Here is /d0/sys/diskstep:

```
l ccdisk
. <SPACE> .+1fe
=12
l ccdisk
. <SPACE> .+204
=08
=8B
l ccdisk
. <SPACE> .+2DD
=42
l ccdisk
. <SPACE> .+2e9
=02
q
```

Moore writes that you can also decrease C compile time by using the separate compilation option for extremely large programs. "First, separate the main program from the user written functions," he said. "Then, after the functions are 'bug-free,' you can compile them, but do not link them. To do this, use the following command line.

```
OS9: cc1 myfunctions.c -r
```

When you run this command line, the compiler puts its output in a file named *myfunctions.r.* After you are finished with your function files, work on the main program. When you are ready to compile the entire program, use a command line like this:

```
OS9: cc1 mainprogram.c myfunc
tions.r
```

You may use more than one function file on your command line. They don't even need to be compiled ahead of time, either. In this case, the name of your function files would still end with '.c.' The command line might even look like this:

```
OS9: cc1 mainprog.r myfun.c
myfun2.r myfun3.c
```

This command line is legal and, when run, the compiler first compiles all the files with a '.c' extension, then links all of the files together. It's all automatic

```
int page , first ;
{
if ( ! first ) printf ( "\f" ) ;
return ( 4 ) ;
}

int header ( string , page ).
char *string;
int page ;
{
printf("\n\nFILE NAME <%40s> page %-4d\n",string,page#;#prtime ( time )
printf ( "\n\n" );
return ( 5 ) ;
}

voi# prrime (p)
strrct sgtbuf  p;
{
printf ("%02d/%02d/%02d %02d:%02d:#02d",
p->t_year,p->t_month,p->ttday,p->>_hour,p->t_minute,p->t_second);
}
```

Listing 2:

```
main ()
{
 sdump (3, 1, 2);
}

#define XPIXELS     256
#define YPIXELS     192
#define PPATH       1
#define INPATH      0

/* maximum number of bytes to read at a time */
#define MAXREAD     (XPIXELS/8)*7
```

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```
/* size of the string, in bytes, which puts the
   printer in graphics mode */
#define STRSIZE   4

/* xdots and ydots define the dimensions, in
   printed dots which make up each pixel */

/* gmode selects one of the printers graphic modes */

/* xdots=3, ydots=1 and mode=2 produce a small,
   accurately proportioned picture, about 1/2
   page wide */

/* xdots=3, ydots=2, gmode=1 yields a accurate
   image aproximately the width of the full page */
/* other combinations of values produce images
   streatched in one of the axes*/

char outbuff [2048], inbuff [MAXREAD];

sdump (xdots, ydots, gmode)
int  xdots, ydots, gmode;
{
/* each entry in this table should begin with
   the characters to set the printers line feed
   to 7/72'nds of an inch, then initalize the
   graphics mode */

static char *grafinit [] = {
  "\x1b\x31\x1b\x4b",  /* 60 dot/inch */
  "\x1b\x31\x1b\x4c",  /* 120 dot/inch */
  "\x1b\x31\x1b\x7a"   /* 240 dpi */
};

static char bit_table [8] = {0x1, 0x2, 0x4, 0x8, 0x10, 0x20, 0x40, 0x80};

int i, j, x, y, pixel, bitrow=6, index, done=0;

char c='\0';
```

on Microware's excellent C Compiler.

Finally, Moore begged to differ with a C language BASIC INKEY$ function we published in January and submitted a much simpler version:

```
setbuf(stdin,NULL)
```

Moore says if you place this line at the beginning of a program, it will cause all future calls to getchar( ) to simulate the INKEY$ function. At the same time he notes that it doesn't seem to affect fscanf( ) or other I/O calls — even ungetc( ) still works. Thank you, Rick.

Moore's closing line was a challenge to all "KISSable OS-9" readers. If you accept, send your version of a C function that simulates INKEY$ without the wait to us in care of THE RAINBOW.

C Tips

Our final C tip comes from Albert Pinto, who works for the U.S. Army Night Vision and Electro-Optics Lab at Fort Belvoir in Virginia. He uses a pair of quad density drives — 2880 sector per disk — on his Color Computer to do a lot of C programming. He sent us some information about the bytes to change to use only one of these drives with the

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Microware C Compiler. Here are the two changes and the revised CRC bytes that will let you save them without going the Verify step.

Location	New (one disk)	Old (two disks)
cc1		
0ee6	30	31 (Disk Number)
1f4f	a5	3c (CRC)
1f50	56	a4
1f51	8a	df
c.prep		
133d	30	31 (Disk Number)
27a9	01	2a (CRC)
27aa	a5	59
27ab	16	ad

Quote of the Month

We'll wrap up the column with a "quote of the month." It comes from Greg Morse writing in *MOTD*, the OS-9 Users Group newsletter: "Standards are wonderful. There are so many to choose from."

What else can we say! I hope everyone has a happy holiday season and a prosperous 1986. Next month, we hope to have the official results from the OS-9 Users Group election and lots of news from RAINBOWfest-Princeton. ☐

```
        /* initalize printer to power-on configuration */
        write (PPATH, "\xlb\x40", 2);

        do {
           if ((i=read (INPATH, &inbuff [0], MAXREAD)) < MAXREAD) {
              done=1; /* last time thru the loop */
              while (i < MAXREAD)  /* clear extra bytes*/
              inbuff [i++]=0xff;
        }
        for (y=0; y < 7; y++) {
          for (i=0; i < ydots; i++) {
             index=0;
             for (x=0; x < XPIXELS; x++) {
             pixel=inbuff [(y*32) + (x/8)] & bit_table [7- (x & 7) ];
             for (j=0; j < xdots; j++) {
                  if (pixel)
                  /* change above line to if (!pixel)
                     for a negative image */
                      outbuff [index++]&=~bit_table [bitrow];
                  else
                      outbuff [index++]|=bit_table [bitrow];
             }
          }
          if (--bitrow < 0) {
             /* initalize printer to graphics mode */
             write (PPATH , grafinit [gmode], STRSIZE);
            /* tell printer how many graphics bytes
               follow */
            write (PPATH, &xdots, 2);
            write (PPATH, &outbuff [0], XPIXELS * xdots);
            write (PPATH, "\n", 1);
            bitrow=6;
          }
        }
     }
     } while (!done);
     /* return printer to power-on settings */
     write (PPATH, "\xlb\x40", 2);
    }
```

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